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## GENERAL ARTICLES

### PHARMACY IN UNIVERSITY EDUCATION FOR THE HEALTH SCIENCES \*

GEORGE T. HARRELL

#### ORIGIN OF THE HEALTH SCIENCES

Historically the health sciences were one. In the days of the priest and witch doctor, when observations were first made on measures that might improve the health of people, the same person probably filled both positions. As civilization developed, medicine began to be separated from religion, in which it originally started. Observations were made on the effects of natural products: foods, plants, and minerals. Often these observations were made by preachers or other religious people. Fundamental studies on genetics were done by a monk, for instance. The first direct physiological observations on measurement of blood pressure were done by a minister, who had a young mare tied down in his pasture one morning and a brass tube inserted in the carotid artery.

Historically the storehouse of knowledge has been in the hands of educated men. In the general field of medicine, and particularly in pharmacy, this was true of the Chinese, Egyptians, East Indians, and Arabians, all of whom contributed greatly through direct observation of the effect of naturally occurring materials.

In Colonial America the family physician was the keystone of practice. He served not only as the diagnostician but as the surgeon, obstetrician, dispensing pharmacist, and psychologist, in so far as there were any. The educated men in the community were the preacher, lawyer, teacher, and doctor. The universities continued their traditional role as storehouses of information and also accepted the further responsibility for the development of new theories. Most of this work was done within the framework of a classical education.

With the rise of scientific knowledge, changes have come about in this educational pattern. The original scientific ob-

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\* Presented to the AACP, Detroit, Michigan, 1956.

servations probably were made in the field of astronomy. From astronomy it was a natural step to mathematics, from mathematics to physics, more recently to chemistry, and finally to true scientific observations in the field of biology. A fundamental concept of biologic science is variability. No two living things are exactly identical, whether one is dealing with plants or animals. Furthermore, when serial observations are made on a single living thing, this individual does not always follow exactly the same pattern, and the data, when plotted, never fall on a smooth curve.

In the development of the true sciences we have many good illustrations of the interdependence of one phase of science on another. For instance, out of chemistry came microbiology less than one hundred years ago. The fundamental observations of Pasteur, a chemist, were made on the souring of wine. After he found tartaric acid crystals, he discovered that they were produced by microorganisms. Until the science of chemistry had come to the stage where these observations could be made, no new scientific offspring could develop.

In the field of medicine, pathology is another science which is less than one hundred years old. Pharmacy and nursing, two other health sciences, are approximately of equal age. The technologies, as we know them, however, are only twenty-five to fifty years old. Society has accepted the principle that technologists should be allowed to handle work whenever they can do so competently, so that professional men can be saved for duties that no one else can perform.

#### PHARMACY AS A PROFESSION

The pharmacist, as well as the physician, has been a professional man. This recognition implies that he has superior knowledge in his field, is basically scientifically grounded and is responsible to society for his actions. A professional man must be able to make decisions by himself, to act on his own decisions and to stand responsible to society for his actions if he is wrong.

We sometimes forget that in our professional work, whether in pharmacy or in any other of the health sciences, we are dealing essentially with an interpersonal relationship. We are dealing with people as individuals. But people, as living beings, are variable. Microorganisms, dogs, and plants are variable, but people are much more variable. The difference between brothers and sisters, or the difference in the same individual in similar situations when observed over a period of years, is considerable. When we deal with people, particularly when they are sick and

emotionally involved, we must understand how variable they can be and recognize the stresses and strains that are placed upon them.

In the health sciences, if we are to meet scientific criteria, we must study groups in order to smooth out the variations between one individual and another. But when one practices in the area of the health sciences, whether it be medicine or pharmacy, he deals with a single individual. When one attempts to apply observations made on one person to conclusions or laws derived from studies of a group, he is facing a scientific and statistical impossibility. He is not working in the realm of science and is never going to work in the realm of science. Medicine and pharmacy, as they are practiced, can never be sciences, regardless of how accurate our scientific tools become. We practice an art, and will continue to do so. This fact should be impressed on students who are thinking of going into these fields. We do operate in a scientific realm when we contribute to new knowledge. We do this through research, where we have learned through long experience that when we study groups we can meet scientific criteria.

Let us examine for a moment what the job of the pharmacist is in the local community. We expect the pharmacist not only to stock and to dispense drugs but also to run a supermarket, hardware store, liquor store, and quick lunch stand. None of these activities seem to be really the job of a professional man.

We have placed on the pharmacist the responsibility for handing out or withholding patent medicines from those who seek them and for advising people on home remedies which might be used for minor illnesses. These activities do seem to be proper provinces for a professional man.

Are we sure that this professional man realizes that all drugs, regardless of what they are, are potentially harmful? If they were not potentially harmful, they would not be effective. There is an old folk saying, "One man's meat is another man's poison." This fact is just as true with penicillin and aspirin as it is with beefsteak and onions.

Drugs work because they apparently affect in some fashion or other intracellular enzyme systems. When a drug competes with other chemical compounds inside a cell, it blocks or alters a normal function, and hence is potentially harmful. A professional man should understand these functions, and should be able to advise patients about the risk they are assuming when they take a drug. Whether one is advising people in the field



of genetics, medicine, or pharmacy, he is operating within the bell-shaped probability curve; one can give the patient only a statistical evaluation of what risk might be expected.

Does the pharmacist recognize that in medicine we are faced with another subtle problem of great magnitude? If the records of a private practicing physician, a group practice clinic, or a teaching hospital are examined, one will find that approximately 40 per cent of patients present symptoms for which the physician never finds an organic cause. It apparently is immaterial whether he is in general practice, gynecology, pediatrics, or internal medicine. In the whole field of health sciences, we lack much basic information for treating people intelligently.

We should recognize the further responsibility of the physician and the pharmacist for continuing the education of patients and their families in the care of illness in the local community.

#### PHYSICIAN-PHARMACIST RELATIONSHIP

How could the relationship between the physician and the pharmacist be made more effective? In each community, the physician looks to the pharmacist for detailed information on new drugs, for advice on pharmaceutical specialties and on the cost of these products. This service is given to the physician so that he can better serve the public. Should not the pharmacist be more concerned with nutrition in a broad sense than with the business of a quick lunch operation? A great deal of the dollar volume of the pharmaceutical business comes from vitamins and other types of food supplements.

Is it not equally important to recognize that many chemical methods are based on bacterial synthesis? It is astounding to think that a single microbial cell of a human parasite contains essentially the same intermediary metabolism found in the cells of the host (patient) who is infected! If this concept is grasped, the pharmacist will develop a broad view of microbiology, and can help the physician more effectively in the selection of products to be stocked.

Another great avenue for mutual help in the physician-pharmacist relationship is the hospital pharmacy. This area could easily develop as a specialty within the general area of pharmacy. In the training of house officers it could very well become the job of the hospital pharmacist to inform the house staff regularly, and the visiting staff as well, about new products as they come out, considering particularly the nature of the active ingredient and the other forms of the drug which



# UNIVERSITY IN MEDICINE

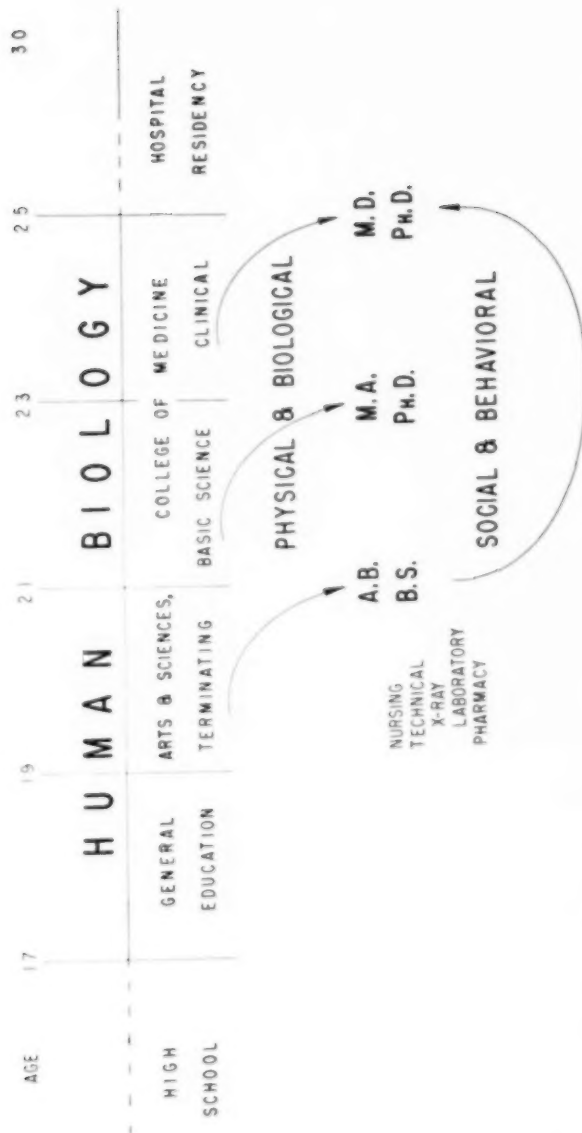


FIG. 1 THE HUMAN BIOLOGY THEME IN TEACHING THE HEALTH SCIENCES

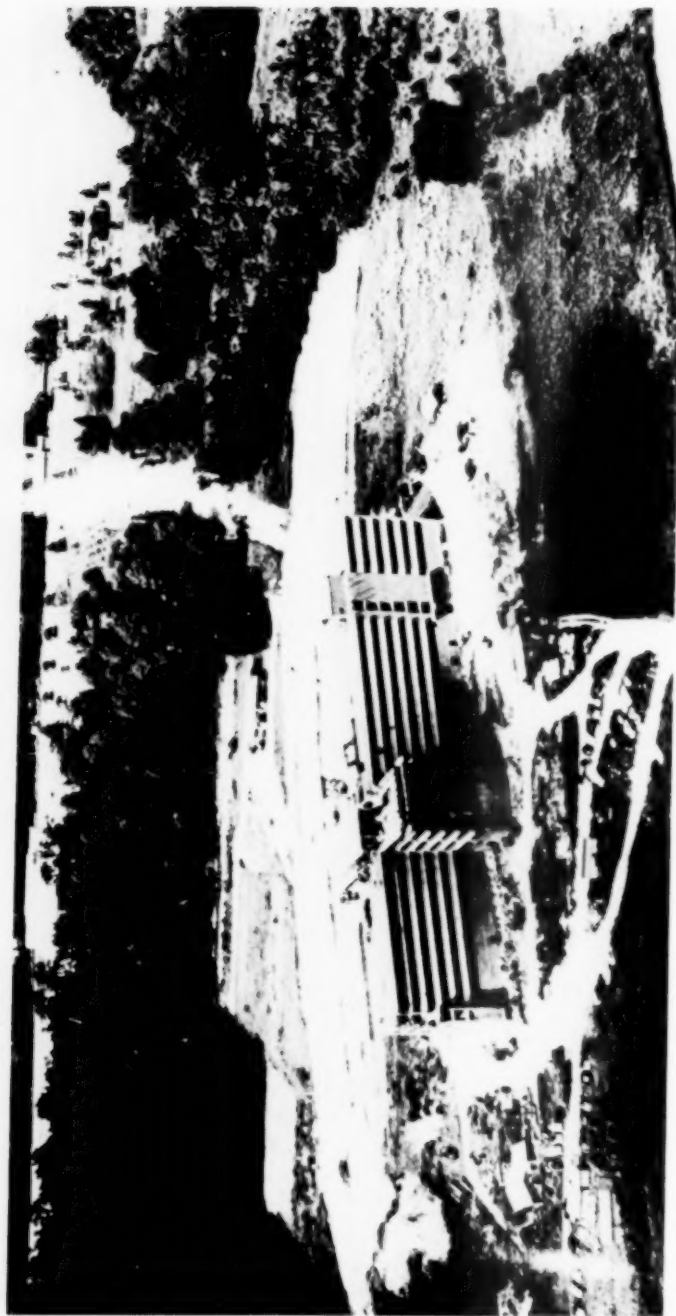


FIG. 2 SITE OF THE J. HILLIS MILLER HEALTH CENTER, UNIVERSITY OF FLORIDA

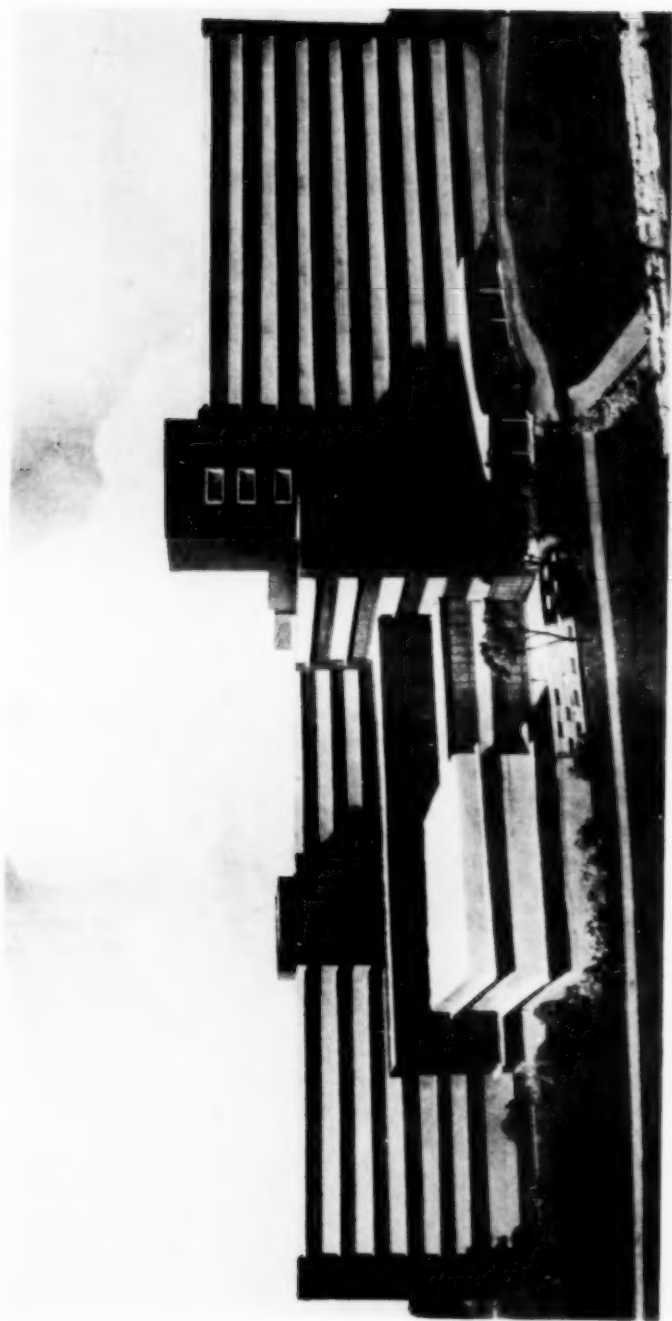


FIG. 3 MODEL OF THE SECOND STAGE OF THE J. HILLIS MILLER HEALTH CENTER, UNIVERSITY OF FLORIDA

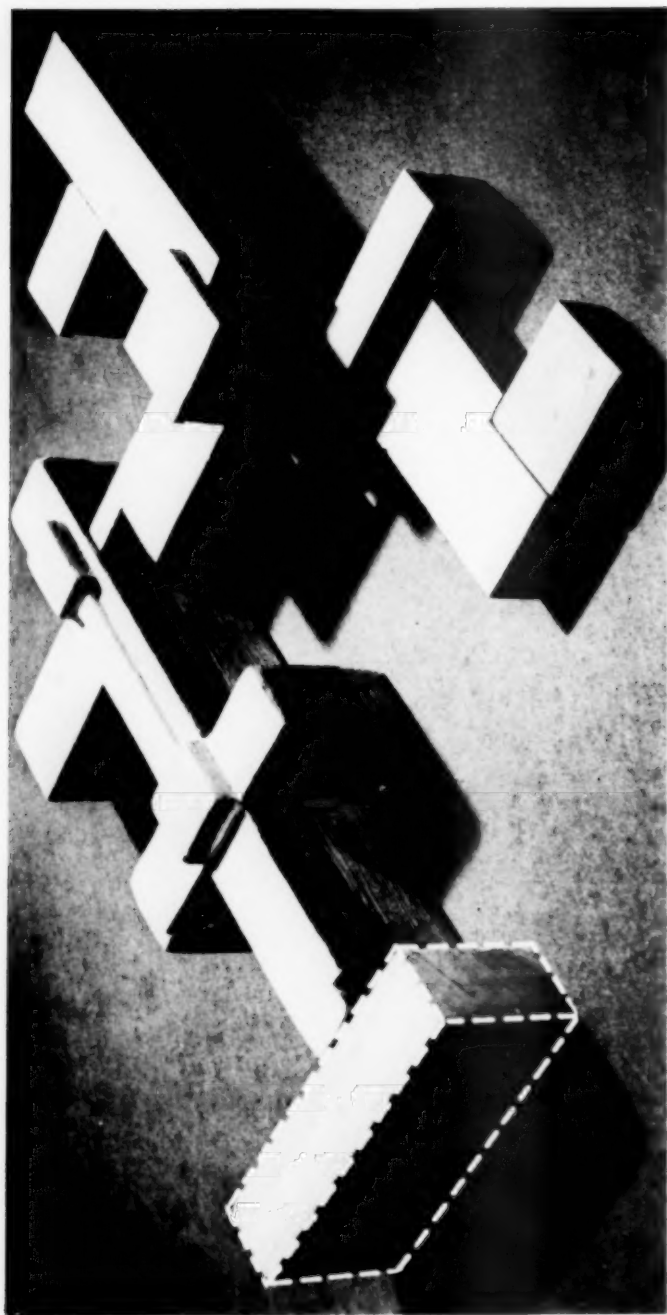


FIG. 4 MODEL OF THE J. HILLIS MILLER HEALTH CENTER AS IT WILL APPEAR IN 1960 (PHARMACY BUILDING OUTLINED)

are available. The continuing education of physicians can be accomplished in a professional atmosphere and from a professional point of view in any community hospital, whether or not it is a teaching hospital. Preferably, this type of teaching should be done in conjunction with the activities of the county medical society on a continuing, regular basis, rather than by the professional service man who sees a single physician and presents a biased opinion because his bread and butter come from one manufacturer. The hospital pharmacist could help to reduce the cost of patient care. All of us concerned with the field of health have a responsibility to examine the great cost of medical care and to reduce it for the patient whenever possible. Pharmacists have made great strides in manufacturing, and one need only look at the reduction in the cost of antibiotics and of hormones, that are now made synthetically, to appreciate this fact. The hospital pharmacist can apply many techniques of manufacture and preparation to the small community hospital.

#### PHARMACIST IN RESEARCH

What is the pharmacist's responsibility in research? In graduate education, where research is begun, the relationship to the college of medicine finds its closest expression. The pharmacist in research can study the isolation, purification, and synthesis of new drugs, the development of manufacturing controls and the methods necessary for improvement in production. It is most important that as a nation we recognize that much more effort must be put into all of the health sciences, as well as into engineering and the physical sciences, than has been done in the past. Basic research in these fields, and particularly the early recognition, recruitment, and development of scientific manpower with potentiality for research, will help us to raise our scientific seed corn for future generations. If one looked only at the most recent information we have on the strides taken in Soviet Russia in these fields, he would begin to quake in his boots. Think what might happen within ten to twenty years if advances in the health and biological sciences take the same strides that have been made in Russia in the physical sciences, as judged by their progress in the fields of nuclear weapons, the application to power production and jet aircraft design.

#### UNIVERSITY-WIDE EDUCATIONAL THEME

How do these thoughts apply to education for the health sciences in a university setting? Some form of continuity in

education is essential. It would be highly desirable if one could recognize early in the course of the educational process all of the people who ultimately might care for patients in the local community. How much more effective would this medical team be if one could basically orient at the same stage in the educational process all of these subsequent team members, regardless of the particular part of the field in which they ultimately settle. If the principles of classical education which have proved to be effective over many centuries are followed in the training of a professional man in a university setting, principles and theory must be emphasized. The rate of progress, technologically and scientifically, has been so great that teaching of detailed facts is impractical.

When prescriptions in a local drugstore are analyzed, as many as 90 per cent of them are for drugs which were completely unknown as short a time as fifteen years ago. Both the physician and the pharmacist must be prepared as educated professional men to develop a technic for continuing self-education the remainder of their professional lives. The framework should be applicable to the local community.

How would one start this educational process in a university setting? Since we are dealing with living things and living things are the field of study for biology, the orientation should be biological. In medicine we are dealing predominantly with a single species, the human being. Pharmacists deal with a broader field since they furnish drugs for treating farm animals, small animals, and pets. A theme of human biology can serve university-wide as a continuous educational thread on which all facets of education in the health services can be hung. If the student were basically oriented to this point of view as early as possible in his education, an interchange of faculty from several colleges would be possible. It would be desirable for graduates of any facet of this educational program to come back occasionally for orientation. Our teachers from any college in the health services must have a broad view and some appreciation of all the facets of this subject.

By better early selection of students, the rate of attrition could be cut considerably. Better counseling and guidance should be done early before the student makes his initial selection of a field within the health sciences.

Figure 1 graphically diagrams how a theme of human biology might be used in a university setting. The emphasis is not on a medical school in the university but on the university in medicine in the broad sense. The problem of general education

is of concern because all professional people must be, first, educated men. A broad general education is necessary. We believe that if people from pharmacy or medicine were brought back through counseling or, in radio parlance, through spot appearances, students might be more effectively helped to select a terminating program at the end of two years, on the basis of their drive, intellectual capacity, interests, family situation and other factors. Some will end up in nursing or the technologies which terminate at A.B. or B.S. level. Others will aim at a master's or doctor's degree in science, and others will continue along this thread through medicine and a hospital residency. Let us remember the 40 per cent of patients who do not have organic disease. Most pharmacy training has been directed toward the correction of truly organic conditions. Only in the past few years are we beginning to get some hints that such diseases as schizophrenia and perhaps other types of mental disease may be caused by an alteration in metabolism. We should not lose sight of the fact that at all times more hospital beds are continuously occupied by mentally ill patients in this country than by all other types of hospital patients combined. Through the use of tranquilizing drugs and through biochemical studies on their mode of action, we are making progress toward an organic basis for mental illness; but, until this is proved, we must assume that most mental and social disturbances are the result of stresses and strains in society and not of organic disease.

Figure 2 shows the site we have chosen at the University of Florida for the new Health Center. It is located on a highway for transportation close to the center of the University, but gives a feeling of separation into a satellite unit by itself. The Medical Sciences Building which is shown is now nearly completed. This building was conceived with a clinical wing toward the right and a basic science wing toward the left in the photograph, with supporting facilities in the cross-wing between. The newest women's dormitories, where nursing and pharmacy students will live, are shown in the background, as is the parking lot with the landscaping started. The openings for the connecting link to the hospital are shown.

Figure 3 is a model which illustrates the next stage for which we have broken ground. The clinical teaching facilities—hospital, ambulatory unit, and the clinics, reading from the right to the left—are shown from the highway side as the patient will approach it. The Medical Sciences Building is in the left background. The facilities for patient care have been conceived

as the educational counterparts of the conditions under which students in the health sciences will practice in the local community. Most disease occurs in the home, and 85 per cent of illness can be handled there with what the physician can carry into it in his bag and in his hands. We are setting up the counterpart of the home, the office and the hospital. We have designed into each of these facilities areas where pharmacy students might be taught side by side with medical or nursing students. In each ward in the hospital, for instance, a separate area for medications is connected by dumb waiter with the central hospital pharmacy, and is adjacent to a classroom and laboratory. Any type of continuing education might be done jointly by faculty from several colleges with any of the students in the health services. In the ambulatory unit we are providing the counterpart of the retail pharmacy so that the student can see how this facility is used for patients in the home.

Figure 4 shows how the Health Center might look four years from now. The College of Pharmacy will be built (and we hope this will start after the next Legislature meets in 1957) at the basic science end of the present building so we might jointly share our animal quarters and other basic teaching and research facilities. This location would permit us to integrate our pharmacy students with certain aspects of the basic sciences and clinical medicine, keeping the Health Center Library as the educational hub for the entire unit.

#### SUGGESTIONS FOR PHARMACY EDUCATION

What concrete suggestions could be made now for pharmacy education? First, general education with broad biologic orientation should be given. Traditionally and historically the pharmacist came up through botany, but now he needs a broad view of zoology if he is to continue to operate in the field of animal, including human, welfare. More emphasis should be placed on microbiology, because of the trend toward having the hospital pharmacist assume more and more responsibility in the local community for the preparation of parenteral solutions, and for the dilution of antibiotics as well as for advice in their use.

The curricula should be examined and fewer details and technics taught, for many facts may be out of date within ten years, as they are in the field of clinical medicine. Most important, let us remember those 40 per cent of people who appear with symptoms not organically based. Fundamentally, phar-



macy is an art and not a science, and when one is dealing with an art in an interpersonal relationship a far better understanding of people and the role of society is essential.

The pharmacist must be, as he always has been traditionally, an educated citizen, informed in the general field of health. We are in a time of rapidly evolving change, both socially and scientifically. It is a time for taking stock and for revising our concepts. If we plan intelligently, we will find that the pharmacist and the physician each play an essential role as members of the health team.

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*Regimented medical practice, pharmaceutical practice, and public health practice would indeed become unnecessary and undesirable from governmental and public viewpoints if all of the agencies training young men and women to serve in the public health fields could sit down together and not only integrate their programs of instruction but, as well, integrate their ideals of service!*

Robert C. Wilson, Am. J. Pharm. Ed., 8, 98 (1944)

## PANEL: PROBLEMS OF ADMISSION FROM PRE-PHARMACAL PROGRAMS \*

MODERATOR: HAROLD G. HEWITT; PANELISTS: LLOYD E. BLAUCH,  
LOYD E. HARRIS, WILLIAM N. ATKINSON, AND JOSEPH B. SPROWLS;  
DISCUSSION: R. A. DENO

*Lloyd E. Blauch*

(Pre-professional Education for Pharmacists)

There are three major questions that it seems to me we need to ask with respect to pre-professional education: What is to be accomplished by pre-professional education, how much time is to be devoted to it, and what prescription shall we make for it?

In view of the fifteen minute limit I shall deal only with the first of these questions and make an observation regarding the professional curriculum.

In the past, some professional curriculums have included instruction that, although it was related to the main purpose of the curriculum, was also intended to broaden the student's social and cultural understanding. However, there has developed a definite tendency in nearly all forms of professional education to omit or crowd down into the preliminary education subjects that are not definitely specialized.

There is an interesting history here. In the days when professional education was largely proprietary in its organization, it was, of course, exceedingly technical. As the universities began to adopt professional education and bring it under the university tent, they insisted generally that it be combined with a certain amount of what we now call liberal or general education. But as that process went on and as information developed in the professional fields, there came a tendency always to crowd out the more general subjects and push them down into a preliminary requirement for admission to the professional school, or, in other words, to separate general from professional education.

Teachers of professional courses have been jealous of any diversion of the student's time and diffusion of his effort when intensive study was required in the specialized field. In general, they have demanded that the professional course be the student's sole pursuit at the time.

Then, on the part of students, they have resented the study of subjects that have no direct or specific relation to the attainment of the principal objective of the professional curriculum as they

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\* Presented to the AACP, Detroit, Michigan, 1956.

understood it. So, when subjects that were general in character were forced upon them, they avoided such subjects as far as possible or pursued them only half-heartedly.

This situation has been further complicated by the way in which education tends to be organized in our country. We set up organizations and draw sharp lines. We have the high school period ending at the close of twelve years, and then more recently we have tended to develop another institution, the junior college, which covers about two years of work. Many of the liberal arts colleges also have organized themselves in such a way that the first two years become somewhat separated from the last two years. So we find ourselves in a situation which almost forces us to draw a line administratively between what we call pre-professional or general education and professional education.

At any rate, the result is a situation in which the general education of professional student is to obtain in school must usually be covered before he enters upon his study of the professional curriculum. As I see it, this situation is unfortunate, but we shall probably have to accept it.

Before going further in this matter, we need to observe that the field of general education is beset with numerous difficult problems. The faculties of the liberal arts and junior colleges are fairly clear as to the objectives they should set for the student, but they disagree intensely on the programs they should provide for the accomplishment of these objectives. All too many college teachers do not think in terms of sound students' objectives.

The situation is aggravated by the fact that many college students do not fully understand or whole-heartedly accept the objectives of the college programs. This confusion and disinterest are responsible for an achievement that is much below what should be expected in the colleges of liberal arts. As we consider pre-pharmacy education, we need to keep this fact in mind.

Let us now ask what purposes should be served by pre-pharmacy education. I believe we may think of at least five. *First*, the preliminary college education of the prospective student of pharmacy should enable him to decide for or against pharmacy as a career, provided he has not previously made that decision. In case he has previously made the choice, his preliminary college education will enable him either to confirm that decision or to see that his decision may have been a wrong one. During this period of his education, he learns to cope with a new educational situation in which he must, to an increasing extent, stand on his own feet. He undergoes rather severe testing which is quite revealing to him. His intellectual and social horizon is broadened.

It is well indeed that he undergoes these experiences before he enters the professional school. If he decides to go on, he does so with greater understanding. If for any reason he fails in this preliminary instruction, or if he concludes not to pursue a professional career, the shock may not be particularly serious, especially if he has discovered new avenues of interest. In other words, if he fails in what he would like to accomplish or makes the discovery early that he doesn't want to pursue this particular professional career, he has not proceeded so far that he cannot turn in some other direction. He can find other avenues of study and service that will be just as useful, or more useful, perhaps, from his point of view.

So this period becomes for him in part a time when he can test himself, and make his decision more firmly. I think the professional schools have a right to expect that when he comes to them he has maturity of judgment as to whether or not he wishes to continue in the particular field.

*Second*, the preliminary college education should afford a screening of students for the professional school. During the early years of higher education, there are usually many failures on the part of students. The pre-professional education saves the professional schools from dealing with many failing students who would become a detracting influence. It is well to have the preliminary screening done in institutions that make special preparation for it. The junior college or the liberal arts college is usually better prepared to look at the student from the point of view of his whole interest in these earlier years of his college education than are the professional schools.

The professional school, therefore, expects this screening to be done in the light of the student's interests, concerns, and abilities, and from the point of view of the way in which the liberal arts college has set up its counseling service, its testing service, and other forms of service that help to screen out the students who are not likely to make a success of a professional career. The professional school, it seems to me, has a right to expect this as a second function.

Now, *third*, pre-professional education provides a foundation of knowledge, study habits, methods of thinking, and certain social understanding upon which a professional curriculum must necessarily rest. As the student achieves these results he develops the intellectual maturity that enables him to acquire in his professional study the facts, principles, skills, and attitudes that are required for competence in the practice of his chosen profession. Care must be exercised, of course, so as not to prolong unduly the education

of our professionals by unduly prolonging either the pre-professional or the professional study, but undoubtedly greater maturity on the part of the student in the professional schools is a leading factor in the elevation and improvement of professional practice.

In other words, by requiring a period of preliminary college education, the student will come into the professional school with greater intellectual maturity. The professional education can be pitched on a much higher educational level, and can, therefore, be a much more successful form of training.

Then, *fourth*, pre-professional education should strive to enlighten the student on those matters that relate to his civic, economic, and political duties and responsibilities. It must strive diligently to develop a sense of social responsibility so that one will view his actions in the light of their effects, not only upon himself but also upon his profession, his community, and his nation.

*Fifth*, pre-professional education must be concerned with developing certain cultural interests and background. If a professional man is to participate actively in the cultural life about him, if he is to share in the enrichment which comes from associating with cultured and intelligent people, he must bring to that participation and association a background of understanding and appreciation of many things that conduce in no special way to the efficient discharge of his professional duties. The ability of the professional man to enter into the cultural life of his time, to understand the world in which he lives, to relate the world of the past with the present and the future, to enrich and discipline his tastes—in fine, to set himself above the daily commonplace—is a factor of no mean importance in fortifying him for his arduous duties as well as in elevating his professional practice and dignifying his profession. Professions are judged, at least in part, by the general intellectual attainments of the men and women who practice them. In the opinion of the public, professions should be practiced by men and women who are broadly educated.

On occasion it is suggested that general education has to perform all the functions just outlined. To my mind, that represents an inadequate view. General education cannot carry the entire responsibility. Professional education must likewise share these goals. It, too, must help to make good citizens. It, too, must set its purposes in the light of a rich cultural heritage, and it, too, should aim at developing the student's personality and making of him a well-balanced person.

I have tried to indicate five purposes or five objectives. Three of these can be accomplished, or should be accomplished to a very large extent, by the one or two or three years of pre-professional

education which a student should attain in a college of liberal arts or in a junior college. The other two—developing a social consciousness and making him a part of the culture of the civilization in which he lives—are a never-ending process. The preliminary education will not do the whole job. We must not expect it to do that. What I am trying to say is that I think the professional curriculum itself, and the professional school, must also include those achievements as a part of its goals. We cannot expect all this to be accomplished in a period of two years.

Incidentally, the effectiveness of general education in the two years is greatly reduced by the fact that it is necessary under present circumstances to force down into those two years subjects which in the nature of the case are largely professional in their outlook. That is, the student takes them from the point of view of a rather immediate use he is going to make of them. So what we call general education receives at best only minor attention in the preliminary college education. It becomes necessary, therefore, that, as the student pursues his professional curriculum, he not be permitted to lose sight of general education objectives as well.

There is another factor that should have consideration. I refer to the goals to be achieved through a liberal education. Obviously, they cannot be attained by the immature student in the first two years of college. Therefore, as I look at this matter, it seems to me he needs, as he matures in his professional work, in his professional studies, constantly to keep maturing his outlook from the point of view of these broader things, and he should not, therefore, ever be allowed to forget or neglect them.

I am reminded here, just to illustrate a point, of one Sunday morning about eight or nine years ago when I wandered into a men's Sunday School class. The class that morning was being taught by a professor of Iranian languages and literature at Princeton. He discussed the historic roots of Zionism. It was a marvelous exposition. This man had first-hand knowledge of the situation. He had wandered all over the Near East. He had first-hand acquaintance with the archeological discoveries and studies, and he was able to relate this theme with the whole situation in which it had arisen. He traced through the Old Testament, the New Testament, and subsequent history this idea of Zionism, and for once the whole concept "came to life" for me. Up to that time it had been only a word. Here was a man who took a particular concept, a large one to be sure, and so illuminated it with words and with logic that I was able to understand a significant fact of history.

In the same way a great teacher dealing with any great field of study, no matter whether it is chemistry or mathematics or biology

or pharmacy administration, should be able to take the large concepts with which he works and so to relate them to the life of the time in which he lives and the interests and concerns of the student that these concepts "come to life." The student should see them as part of a growing civilization, as part of a great record of culture and ideas that have been developed by the leading minds of the ages and have been set down on the record for future generations to use.

This idea of which I am speaking now, the illumination of our civilization through any kinds of ideas, can become one of the goals that can well run all through the professional curriculum. That means, of course, that general education is not necessarily accomplished through a particular content. It is acquired very largely through the approach to the content, through the way in which the content is brought together, the way in which its relationships become apparent, the way in which it is related to the thinking of the person who is being educated. While we necessarily, from an administrative point of view, draw certain lines in our educational programs, we must not think that, just because we have drawn a line here, this idea of general education must stop at the conclusion of one or two years of pre-professional education. The whole professional curriculum should be liberalizing.

I know of few professional curricula today that can broaden a student's outlook as well as can the pharmacy curriculum. It combines biology, science, economics, sociology, and many other elements of culture. It seems to me that, from the point of view of developing students into a whole personality, you have a marvelous opportunity because you are dealing with a curriculum which in the nature of the case is very largely general in its outlook.

*Lloyd E. Harris*

(Experience with the Two-Three Program  
at Ohio State University)

Having begun the two-three program only eight years ago, the faculty of the College of Pharmacy of Ohio State University will have only six classes by this June for complete study. Obviously, we have admitted eight groups. This brief period of time and the comparatively small groups must be the basis of our remarks today.

The decision to adopt the two-three program was made after much consideration and deliberation. Having the students enrolled in the College of Pharmacy for all five years was claimed by some to enable the students to acquire a more professional attitude. It



must be remembered, however, that many of the students entering under the old four year plan were admitted with one year of advanced standing. Further, only a minimum of professional courses were taken during the freshman year in college. Thus we, in fact, were essentially on a one-three plan, at least in part. Consideration was given to the idea of having one year of pre-pharmacy followed by four years in the College of Pharmacy. When the credits of required basic science, social science, English, and other non-pharmacy courses were totaled, there were two full years of work. This would give the prospective pharmacy student two years in college to demonstrate his abilities with this background as a partial basis for admission; *those* entering the College of Pharmacy should now be in a position to be truly professional students. They will now devote most of their time to professional courses with some time being permitted to take electives, for further developing their special field of interest. The mortality loss should be much lower than when they were admitted directly from high school. Another factor that was given some weight was the opportunity for many students, who so desired, to complete their first two years of college at an institution near their home or at any place.

The above is a review of the planning phase as to which program should be adopted. As you know, the two-three plan was the one selected. There are still problems to be solved, but our experiences have been reasonably satisfactory.

The first question that will be answered is the one pertaining to mortality of students who were admitted. The first class was rather small, having had only thirty-five in it. All of them except one graduated in the normal period of three years; this represents approximately 94 per cent having successfully completed the requirements for a degree. The following classes varied in size from fifty-five to seventy-two, and the percentage graduating from 80 to 98. No attempt was made in this summary to determine how many of those not graduating with their group were able to complete their requirements for a degree at a later date. It must be stated again that these data apply to only five beginning groups (this year's class has not yet graduated) and a total of only 290 students. The belief that the mortality rate would be lower is apparently justified by the experience to date, but not as dramatically as we might have hoped. An attempt was made to compare these data with a comparable number of classes immediately preceding the change to the two-three year plan, but the confusion of the war and post-war period made this rather difficult so that these data were not submitted for comparison. It can be said that more of the entering students are sure of their objective than when they



came directly from high school, and most of those not qualified or adapted to pharmacy have been directed into other fields of endeavor. The students have acquired a degree of maturity that is missing when they enter pharmacy without pre-college experience. For the benefit of administrative officials, it should be pointed out that their total enrollment figures will drop more than 25 per cent under the two-three year plan, since the relatively larger freshman class of the four year curriculum will no longer be counted.

Perhaps you would like to ask next about the size of the beginning classes over the eight year period. The reports of the Chairman of the Executive Committee of the American Association of Colleges of Pharmacy have made this information available to you. The question can be answered by making the observation that our enrollment in the first year class has grown progressively smaller. It is expected that this year's class will be the end of this experience, and that classes will again grow to a normal size. The explanation for this decline is not one that can be readily given. Perhaps a few possible reasons can be listed. *First*, the decline in entering freshmen in colleges and universities which hit a low point about two years ago last fall would be only a partial explanation. *Second*, many students are interested in completing their college work in pharmacy in as short a period of time as possible. They would, therefore, select a school that was offering the opportunity to graduate one year sooner. *Third*, many pharmacists are convinced that there is little or no justification for the five year program and recommend the schools having the four year curriculum. Ohio State is completely surrounded by such colleges, both from within and in adjoining states. *Fourth*, it is possible that the loyal alumni of Ohio State are outnumbered by loyal alumni of the other colleges in the state. There may be other reasons offered, but they are not so evident as the above and would be nearly impossible to evaluate.

Another question that is of great importance pertains to the pre-pharmacy requirements. What courses should a student be required to have completed before being admitted to the College of Pharmacy? First, it should be said that colleges of arts and sciences will have something to say about what these students will take, since they will be enrolled as freshmen and as sophomores in these colleges. After a pre-pharmacy curriculum was agreed upon by the College of Arts and Sciences and the College of Pharmacy, it had to be presented to a council on instruction for final approval. Obviously, there must have been some differences of opinion. The changes that have been made in the original requirements have

been designed to liberalize the program as much as possible and yet retain certain essential subjects. This is quite evident when the pre-pharmacy program is studied as it appears in the bulletins of the college.

Since not all students who later ask for admission to pharmacy begin their college careers as pre-pharmacy students, the problem of admission with deficiencies arises. Students must have completed two years of college work, of not less than ninety quarter hours before they can be considered. The experience of other professional colleges having pre-college entrance requirements was used as a guide here. As a result, an average, or better, student may be admitted with a deficiency in a very limited number of courses. The deficiencies must be removed before the beginning of the second year in pharmacy, and the hours credit do not apply toward graduation.

After admission, what has been our experience, other than in diminished mortality, with the students? The first result was the complete reorganization of the beginning course in pharmacy. It was no longer necessary to teach weights and measures, except the apothecary system. The students already knew about the different methods for measuring weights and volumes with the exception of the prescription balance and the conical graduate. Having had two years of chemistry, there has been no need for avoiding or oversimplifying chemical reactions when required. The students have been found to have a sufficiently adequate background so that their first pharmacy course can be devoted to the fundamentals. This is followed in their second year by a course that might be said to be our approach to physical pharmacy. Obviously some physical principles must be introduced into their first year course. The course in pharmaceutical mathematics was eliminated, and the subject is taught in practically all courses that are offered by the College. It is believed that this is the right approach, but we are still troubled with students not being able to handle calculations in a satisfactory manner. Possibly with each instructor presenting his method of teaching the student will be better trained than if the time were again concentrated into a separate subject.

Pharmacognosy is given during the first year in pharmacy. While this may not be the only place that it could be given, it has been satisfactory. No longer is it necessary to memorize certain definitions and other information without knowing what is meant by the terms. Many of you can remember how you passed your materia medica courses. Having had organic chemistry, the terms used in connection with constituents found in plants are easily understood.

Try as we might, it was next to impossible to get physiology into the pre-pharmacy program. This subject is therefore offered for two quarters during the first year in pharmacy. Possibly this is just as good a place as any since pharmacology is taught during the second year and thus follows physiology more closely.

Pharmaceutical chemistry is taught in each of the three years. Inorganic is first, followed by organic and bio- and finally by drug assay. A course in instrumental analysis is offered as an elective during the last quarter of the senior year for those who plan to practice pharmacy in any other place than a drugstore as well as for those planning graduate work. Only a limited number take this offering.

The program in pharmacy administration is undergoing a continuous study. The problem of how to run a pharmacy without actually being in one is not easily or readily resolved. A course in general economics is a part of the students' pre-pharmacy program. Nothing is offered in pharmacy administration until the second year in pharmacy. Two courses in pharmacy management are offered as electives, and most students take them. The other course is required in the third year, and it is a study of the laws pertaining to the sale of drugs and the operation of a drugstore. There is a need for a laboratory course in the actual management of a pharmacy, making use of a "model pharmacy" for purposes of instruction; this will be developed.

There is the problem of electives. There are no electives in the first year, but there is a total of twenty-nine quarter hours distributed over the last six quarters (or two years). This is the minimum. At the end of their first year, students are asked to select a field of specialization. These areas include general practice of pharmacy, hospital pharmacy, manufacturing, pharmaceutical chemistry, pharmacology, and pharmacognosy. Most students select general pharmacy with the objective of working in drugstores.

Each of the above areas has recommended electives within the College and in other departments in the University. It is always a bit of a disappointment when students in the last quarter of their last year elect courses with no laboratories and no eight o'clocks.

Even though the two-three program at Ohio State University has not solved many of the problems in pharmacy education, it can be said that it has met many of the objectives. Students are better trained to be citizens and pharmacists. Time will give us the answer as to how well these graduating seniors make use of their training in the many opportunities before them today.

*William N. Atkinson*

I am pleased to have a place on this panel. The five year curriculum will certainly bring schools of pharmacy in closer contact with the junior colleges and also with the smaller liberal arts colleges. We have some ideas concerning relationships with professional colleges that may be of interest to you. That, I am sure, is the reason I was invited here. The viewpoint I shall express is strictly my own, but I believe it is typical.

First, let me make a statement that I hope will be reassuring. While a pre-professional program may be a new venture to you, it is by no means so for the junior colleges and arts colleges. In fact, with your adoption of this program very few professions—engineering and architecture are the only ones that come easily to mind—continue to admit students directly from high school. I am sure you have thought of this fact in your planning.

One of the first questions you faced was whether the added time should be used for technical or general education. Incidentally, this is a question which will not stay answered, and perhaps should not. However, the stronger voices in such fields as medicine, law, dentistry, and nursing seem to favor the position that better general education makes for higher professional repute and prepares for more efficient learning when the actual professional courses are reached. For the moment, I shall assume that is the consensus of your profession.

Up to now, as I understand it, your schools have been largely self-contained. By that, I mean that the greater portion of your graduates entered the school as freshmen, having been selected as high school seniors. Relatively few, I presume, have come as sophomores, and fewer still with advanced standing from accredited schools of pharmacy. To whatever extent this is true, you have had little experience with pre-professional or first year training outside your own school or the arts school of your university. This is likely to be greatly changed.

Other professional schools draw their students from earlier work on many campuses. Their experience, I believe, should encourage rather than dismay you, but I can well sympathize with some concern you may feel. There are several questions to which you may want specific answers.

The first is, "Can the junior colleges and arts colleges provide adequate pre-pharmaceutical education?" The counter-question is, "Can your own university," or, if you wish to venture outside your proper professional field, "Can you, yourselves?" The answer, of course, is that these colleges have been doing so for years for all

the other professions; and, unless certain requirements of pharmacy are unique with your profession or your desires still so vaguely stated that college administrators cannot interpret them, these same colleges will do so for pharmacy.

If you doubt this, think a moment of the professional people you know who began their college work in junior colleges or liberal arts colleges. In spite of your past preponderance of freshman enrollees, I venture a guess that many of you had some arts and science training outside the universities where you took your degree. Consider, also, the fact that almost all, if not all, of the surveys of the academic origins of Men of Science show a disproportionately large share coming from the small colleges. Finally, I would point out that the small colleges, especially the public junior colleges, have an even greater incentive toward the success of their students than you do. If the College of Pharmacy of the University of Michigan fails a student he is gone—lost in the population of the state; but if he is also a graduate of Jackson Junior College he comes back home—to vote “No” on the next millage election.

I mentioned earlier two possible conditions that might exist and cause concern. The first was any peculiar requirement of the pre-pharmacy curriculum. There may be such. If so, and we are unable to meet it, rest assured that we will let you and our students know. There are limitations on how far we can go in many professions. For example, we have been able to offer only one pre-pharmacy year heretofore, and our students who spent more time with us did so with full knowledge of this. A similar situation exists in my own junior college in regard to professional nursing, architecture, medical technology, and veterinary medicine. We urge, for good reasons, one which is economy, that you avoid this situation if possible, but if you confront such a problem and cannot work out a reasonable solution with us, we will not quarrel with you. Incidentally, few colleges ever have trouble where the pre-professional program is definitely of two years or more in length, as in dentistry, law, or medicine.

The other condition named was that you may not know exactly what you do want. I have not followed your deliberations closely enough to know to the extent of agreement among you. I venture again a suggestion that you take a tip from your sister professions, which seem well agreed on three principles: First, there are a few specific courses which should be required or recommended in the pre-professional years as prerequisites to freshman courses in the professional school; second, that courses identical with or largely overlapping courses to be taken in the professional school may not be included in the *minimum* pre-professional program; and third,

that the remainder of the courses be distributed among several disciplines. A few still try to include specifics under the third point, but more and more are taking the attitude that general education is our business, and that we should take the responsibility for the time students are with us.

This may be as good a point as any to say that many of you may be unhappy about the general education your students will have. You have probably been associated with a school of arts and science assisting in the teaching of your freshman students. You have overheard and possibly participated in discussions of changes in the general education program. You are aware of the ferment—experimentation, philosophizing, and plain trial and error tinkering that has been going on all over the country. Possibly you have strong personal feelings in the matter. Most people seem to. I happen to be one of the few who does not. I only urge that you recall that if the answers were really so obvious the disagreements would not exist. So please do not be tricked into assuming that a different pattern from that you are most familiar with is necessarily inferior. After all, the objectives of liberal arts and so-called general education are not as far apart as some assert, and there are many roads to Rome.

In spite of what I have said or seemed to imply, I am sure you can count on full cooperation from all the junior colleges of your region in working out reasonable and useful preparatory curricula. If numbers of pre-pharmacy students are sufficient, they will add or modify certain courses to meet your needs, and will welcome your evaluation of their efforts.

Before closing, I would like to say a few words about selection of students. This, I think, is likely to cause you much concern. You will be selecting students who have already had some college work, including some courses, such as chemistry, which you may have taught in the past. What assurance have you that their preparation has been up to your standards? How can you distinguish between the able student whose teaching has been poor and the plugger who has gone as far as his abilities will carry him? There are no easy answers to these questions. It is highly probable that the growing shortage of science teachers, especially, will make science instruction uncertain in the future. But this is not a problem only of the junior colleges. You may even have to fill some of your vacancies with second or third choices. It would be silly to claim that all science training is equal. But please do not act as if you think the science and other pre-professional training in your associated arts college is superior to all others and treat its applicants differently from those coming from elsewhere.



Here again, other professional schools have met a similar situation. Many have solved it by using the results of standardized tests among the criteria for admission or placement. The medical schools have done this for years. Let me cite a practical example of how this works out in the School of Business Administration of the University of Michigan, where we send several students each year. The specific requirements for admission are one year of principles of economics and mathematics through college algebra, together with a good distribution of other courses to complete two college years. Accounting is not required, but a year is acceptable and permits students to work out more electives. Students are accepted on the basis of recommendation and a satisfactory transcript from an accredited arts or engineering college or junior college. However, they are given the National Accounting Examination on entrance. On the results, they are permitted to enter the advanced class, or a short refresher course, or required to repeat the principles course.

In summary, the junior colleges and small arts colleges have been engaged in pre-professional education for years. We welcome the opportunity to extend this service in the field of pharmacy and will do our best to prepare students for success with you.

We urge that you do not defeat your purpose by undue extension of professional courses into the pre-professional years or become dogmatic about the general education elements of the curriculum.

Finally, we suggest that the success that has attended work on problems in the relations of our institutions with other professional schools as well as our more limited contacts with your schools offers both guidance and the promise of further success as we work together in the future.

*Joseph B. Sprowls*

(The Use of Predictive Tests)

The use of educational testing methods for the prediction of probable academic success is a comparatively new procedure and one which is admittedly far from perfect, yet predictive tests have won wide acceptance by professional and specialty schools as one of the criteria to be used in selecting students. Such tests would seem to offer possibilities for use in the selection of students for pharmacy.

Most batteries of tests used in the prediction of probable success contain two types of measures: achievement and aptitude. The meaning of achievement is obvious; the term aptitude is less well

understood. Warren's *Dictionary of Psychology* defines aptitude as "a condition or set of characteristics regarded as symptomatic of an individual's ability to acquire with training some (usually specified) knowledge, skill or set of responses, such as ability to speak a language, to produce music, etc." One should particularly note that aptitude is different from skill, although it may be regarded as the ability to acquire skill under training conditions. Thus, an aptitude test is administered to a student in order to obtain a preview of his probability along lines which are yet untried. Achievement tests, on the other hand, measure the value of past training and experience. Aptitude tests, then, are forward-looking, while achievement tests are, in a sense, backward-looking.

In discussing the value of predictive tests to the future educational program for pharmacy, it will be necessary for me to consider the aptitude and achievement components separately. I prefer not to restrict my consideration to the necessary uses but to mention total possibilities.

Within a few years most schools of pharmacy will be accepting students who have completed one or two years of general college before entering the college of pharmacy. It is assumed (indeed it is probably to be desired) that the school of pharmacy will not have control over this pre-professional training (except in the sense of listing specific requirements). It is also probable that each entering class will be made up of students who have attended a variety of liberal arts or junior colleges. While the one or two years of college will serve as an excellent basis upon which to discard those who do not possess academic ability suitable for college-level studies, it may be of little assistance in helping us to select the most qualified from those who have survived the pre-pharmacy period.

It may be said that this problem is not different from that which faces us now in selecting students from a variety of high schools; however, there is one important difference. Some of the courses taken during the pre-professional period will be basic to the more advanced courses which will be presented during the pharmacy years, and it is important that a high level of achievement be reached in these courses. For example, the first pre-pharmacy year will probably include general chemistry and college mathematics. General biology may also be included. These are courses which are fundamental to the study of pharmacy, and a high level of achievement is important. Achievement tests represent what is probably the only satisfactory method by which the previous training of applicants may be evaluated in terms of a common standard. They, therefore, make possible a reasonable safeguard against the accept-



ance of students who have a poor level of achievement in an important basic area.

There are certain obvious limitations to the utility of achievement tests on a national scale. In addition to the variations which will exist in prescribed curricula for the pre-professional year or years, there may be important differences in the achievement level of students applying from different geographical areas. At the local level, it is possible to evaluate these factors, and selected achievement tests should be very useful in helping to choose the more promising students from a pre-pharmacy group.

The second phase of predictive testing—the measurement of aptitude—has received comparatively little attention as reported in the literature by pharmacy educators; yet its importance may eventually overshadow that of the achievement tests. Aptitude testing is based upon the presumption that certain subjects differ from others in the nature of the mental processes which they require. It is furthermore presumed that a substantial number of individuals differ within themselves in the relative command of these mental processes. The schools of dentistry have happily discovered an aptitude which seems to give a high correlation with probable success in the study of dentistry. This is the Carving Dexterity Test. The Dental Aptitude Testing Program developed by the Council on Dental Education has both achievement and aptitude components.

Are there special aptitudes which are necessary for the study of pharmacy? If there are such aptitudes, what are they and how may they be measured? This represents one of the challenging fields for future investigation in the field of pharmaceutical education. Enough is known to indicate that success is possible. The studies of Remmers and Drucker at Purdue provided evidence of a negative type when it was concluded that tests used in the general prediction of academic success are of comparatively little value in predicting success in the pharmacy courses. If one believes that it is possible to predict success in the study of pharmacy, then it is obvious that this success must depend upon aptitudes which are not commonly measured in the prediction of general academic ability.

At Temple University special admissions tests have been administered to pharmacy applicants continuously for ten years. The program has been of an experimental nature, that is, correlation studies have been made to determine the value of the tests in predicting success in the various departments. When batteries have been found to be of little value, they have been replaced. Our statistics cover more than two thousand cases. As a result of these rather careful studies, we are able to name three abilities which seem to be especially important for success in the study of pharmacy.

These aptitudes or qualities may be described as "a number sense," a good memory, and a verbal facility. The first of these is an ability to understand and to solve simple arithmetical problems. It implies more than a facility with decimals, fractions, and arithmetic procedures, because it involves also the somewhat intangible factor of a problem sense. The second factor, memory, is important in all education; however, it seems to be especially important in pharmacy. This seems entirely understandable when one considers the mass of technical information which must be available to the pharmacist. The language facility is a difficult one to describe, but it relates to the ability of the student to utilize and to understand words. A preliminary report of our tests has appeared in the *Proceedings of District No. 2, AACP* of 1954.

Psychological Corporation of New York City has carried on an admissions testing program at the Brooklyn College of Pharmacy for two years. The conclusions arrived at by this group add confirmation to the findings at Temple University. They found the two best measures to be computational: Proficiency in Fractions and Decimals, and Numerical Relationships and Concepts. Other tests of value were Test of Vocabulary Skill, Test of General Reading Skill, and Test of Clerical Ability.

It must not be assumed that these are the only possible criteria for success in pharmacy. Continued study may lead to the discovery of further aptitudes which are useful for this purpose. Certainly the time is most propitious for the development of such measures. If the predicted increases in college enrollments and the recruitment methods now being distributed by our association and by pharmaceutical industry have their anticipated effect, we may look forward to a period during which we will all have a problem of selecting students. Because of the expense of professional instruction, it will be necessary for us to select with great care so that every accepted student will have the greatest possible probability of success.

*R. A. Deno*

(Discussion)

Presentations of the panellists stimulated lively discussion from the floor, including the posing of many questions for which strongly positive answers were not ventured. There were, however, questions for which one or more of the speakers held fairly definite opinions or impressions:

What is the effect of pre-pharmaceutical college requirements on change in educational goal from pharmacy into some other field? Many pre-pharmaceuticals do change their goals, but on a large campus

the reverse also occurs frequently. The net result is probably better satisfied and more productive students in the professional schools.

Should general education be concentrated in the pre-pharmaceutical years or also extended into the years of professional study? Ideally, it should extend throughout the entire program and far beyond, and probably will be thus extended in many five year programs. Increased attention to the broadening possibilities of many of the professional courses can also help to fortify the general education of students in professional schools.

Are junior colleges developing and utilizing the services of counselors well versed in the needs of the professional curricula? In certain colleges, yes; and students are also encouraged to confer with guidance personnel at universities in planning their pre-professional programs. In general, the junior colleges are eager to learn and to fulfill the pre-professional requirements of such professional schools as pharmacy.

What is the effect of development of junior colleges on attendance in professional schools and upper division units? A study in Minnesota and experience in California shows parallel growth of junior colleges and the more advanced types of institutions. There appears to be no basis for the supposition that as junior colleges develop the upper units experience decreased enrollments. In the minds of some, junior colleges and colleges of liberal arts present a more fertile field for recruitment of pharmacy students than do the high schools.

What is the current status of survey-type courses in general education? They appear to be less popular than formerly, especially the superficial ones, and in many places they have been replaced by standard general introductory courses.

What is the effect of the extended undergraduate program in pharmacy on numbers of students who continue into fields of graduate study? No clear-cut answer was given, but the impression was voiced that about the same proportion of students continued as did under the four year program in the same institution.

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*... optimism must start where the training of the profession begins, and in this capacity the colleges have a great responsibility as well as a fine opportunity to serve the profession.*

George A. Moulton, *Am. J. Pharm. Ed.*, 8, 644 (1944)

## TIME OF ANNUAL MEETING, A PERENNIAL PROBLEM \*

JOSEPH B. BURT

May I say at the outset that little can be said concerning the assigned topic which will be entirely new to you. It should be further understood that any opinions I express are my own and not necessarily those held by the officers of the Association, or by the members of the Executive Committee. It is my hope that I may be able to summarize some of the important considerations which have bearing upon the decisions which must be reached concerning the date of future meetings, and that my remarks will lead to a full and complete discussion of this important question from the floor. I have purposely limited my presentation in order to make this possible. Subsequent to this discussion you will be given an opportunity to indicate by an informal or "straw" vote your preference concerning the date of the annual meeting. This expression will be of value to the Executive Committee in arriving at a final decision concerning this important question.

The only reference to time and place of the annual meetings of the American Association of Colleges of Pharmacy appears in Article IX of the Constitution, which reads as follows:

**Article IX. Meetings.** The Association shall hold one regular annual meeting at a time and place to be determined by the Executive Committee, preferably at the same place and coincident with the annual meeting of the American Pharmaceutical Association.

Since 1900, the date of organization of the American Conference of Pharmaceutical Faculties, the predecessor to the American Association of Colleges of Pharmacy, annual meetings have been held at the time and place of the meetings of the American Pharmaceutical Association. Ordinarily, these were scheduled for either August or September, except for the meetings falling in the same years as the decennial meetings of the United States Pharmacopoeial Convention. But there have been exceptions to this rule. In the interval between 1900 and 1956, although only six Pharmacopoeial Conventions have been held, there have been eleven meetings, if the Detroit meeting is in-

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\* Presented to the Conference of Teachers, AACP, Detroit, Michigan, 1956.

cluded, which were held in months other than August or September. Specifically, these were as follows:

Richmond, 1900, May 8-10  
Richmond, 1910, May 4-5  
Washington, D.C., 1920, May 5-6  
Baltimore, 1930, May 5-6  
Washington, D.C., 1934, May 7-8  
Richmond, 1940, May 6-7  
Washington, D.C., 1945, November 8-10  
(Executive Committee only)  
Jacksonville, 1949, April 24-26  
Atlantic City, 1950, April 29-May 2  
Miami Beach, 1955, May 1-3  
Detroit, 1956, April 8-10

Those of you who attended the Fifty-fifth Annual Meeting, held at Boston, August 22-24, 1954, will recall that the time and place of the annual meeting and of the Teachers' Seminar were discussed at that meeting. It should be remembered that prior to this date, members of the American Pharmaceutical Association had been given an opportunity of voting, by mail ballot, their preference on the time of the annual convention of the American Pharmaceutical Association. As a matter of fact, two ballots were taken, the first permitting a choice among spring, summer, and fall meetings. The results failed to show a clear-cut majority for any one season, although spring and summer were favored over fall. Subsequently, a second ballot was mailed out on which members were asked to elect a choice between spring and summer. On this basis, the majority of votes favored the spring meeting. It is unlikely that a poll of the American Pharmaceutical Association taken now or at any time in the immediate future would alter this situation. If this is true, it is absurd to propose the possibility of holding the meeting of the American Association of Colleges of Pharmacy at some time of the year other than spring, but "coincident with the annual meeting of the American Pharmaceutical Association."

This is essentially what was proposed by this body (the Conference of Teachers) at the Miami Beach meeting last year, as reported under resolution number 31, page 564, of the Summer Issue (Volume 19, Number 3) of *The American Journal of Pharmaceutical Education*. This resolution read as follows:

*Be It Resolved*, that the Conference of Teachers of Pharmacy favors holding a meeting during the summer months, but in conjunction with the American Association of Colleges of Pharmacy and the American Pharmaceutical Association.

When this resolution was considered by the Association, its adoption having been recommended by the Resolutions Committee, an amendment was accepted to transmit resolution number 31 to the Council and the House of Delegates of the American Pharmaceutical Association, and the resolution, as amended, was approved by the Association. Although this resolution was presented to the House of Delegates, as reported in the June, 1955, issue of the *Practical Edition, Journal of the American Pharmaceutical Association*, no action was taken upon it.

If we are willing to accept the fact that a majority of the members of the American Pharmaceutical Association favor a spring meeting, and will in all probability continue to favor spring meetings in the future, then the problem is somewhat simplified. The decision then depends upon whether or not we favor a meeting of our Association to be held independently of and at a different time than that of the American Pharmaceutical Association. Our choice should be based upon a careful study of the possible advantages and disadvantages of a separate meeting scheduled at a time apparently more convenient for a majority of our membership. I shall attempt to comment upon some of these considerations in a few moments.

The principal objection to the spring meeting, as brought out in the discussion of this matter at the Boston Meeting, as well as in the resolution coming from this body last year, is the "hardship" or difficulty of attending the meetings scheduled during the academic year. Let us examine the records of attendance to determine to what extent this contention is borne out by the facts.

In the minutes of the Post-Session Meeting of the Executive Committee, held at Miami Beach, May 4, 1955, item 5 of the minutes, page 582 of the Summer, 1955, issue (Volume 19, Number 3) of *The American Journal of Pharmaceutical Education* carries a summary of the attendance of delegates at the last ten meetings, including the Miami Beach meeting. Seven of these meetings were held in August and three in either April or May. It should also be noted that during this decade, the membership of the Association has increased from sixty-two member colleges to seventy-six (seventy-five active, one associate). A study of these data leads to the following summary.

It should be recognized that other factors influence the attendance besides the time of year. Two of these of considerable importance are geographical location (San Francisco) and whether or not a Teachers' Seminar was scheduled immediately

TABLE 1  
ATTENDANCE DATA

|  | 10-yr. Period<br>1946-55 incl. | August<br>Meetings | April or May<br>Meetings |
|--|--------------------------------|--------------------|--------------------------|
| No. of Meetings                        | 10.                            | 7.                 | 3.                       |
| Aver. No. of Delegates                 | 191.                           | 195.               | 175.                     |
| Aver. Percentage of Member<br>Colleges | 95.                            | 97.                | 95.                      |
| Aver. No. Delegates Per College        | 2.8                            | 2.9                | 2.6                      |

Maximum Attendance: 288 delegates (Aug. 1954, Boston);  
99% of member colleges.

Minimum Attendance: 135 delegates (Aug. 1948, San Francisco); 81% of member colleges.

preceding the meeting of the Association (Boston). However, an examination of these figures does not show that there has been a significant reduction in attendance at the spring meetings. The average number of delegates is somewhat lower (175 as compared to 195 for the spring meetings), but the percentage of member colleges represented (ninety-five) is identical with the ten-year average, and only 2 per cent below the average representation at the August meetings.

I do not believe that deans and directors have had enough experience with spring meetings to realize the maximum potential in attendance. What I am suggesting is that a little more effort in planning the teaching program in order to relieve teachers from regular duties, and a little more persistence in establishing adequate travel budgets would result in attendance records which will exceed those of our August meetings. It should be noted that our colleagues in the fields of medical and dental education schedule their annual meetings during the academic year, and apparently without difficulty.

We should not overlook the fact that quite a hardship case could be made for the teacher who is required to attend an Association meeting (and perhaps a Teachers' Seminar) in August. Terms of employment of our teachers vary, falling into three principal classifications: nine months service, ten months service, and eleven months service. Regardless of the term of service, it is almost certain that a large majority of them would prefer August as their vacation month, and in the case of the eleven months employees this is the only time available for this purpose. The importance of recreation, rest, relaxation, and rejuvenation should not be minimized. From the



standpoint of maintaining the morale of our teachers, it would probably be highly advantageous to make vacations compulsory. Is it fair for us to schedule our meetings at a time which is in conflict with the vacation period of our teachers?

Mention should be made, although this is only incidental to the primary considerations, of the financial expenses which our Association would have to assume if we elect to hold our meetings separately from the American Pharmaceutical Association meetings. Perhaps it is not generally known that the parent organization, the A.Ph.A., makes available to us, without cost, rooms for all of our meetings including those for our sections of teachers and our Executive Committee, publishes our programs, releases publicity on our meetings, and makes all of the arrangements in advance. If we are to hold separate meetings, our budget would have to be increased accordingly, and a considerable added burden would be placed upon our officers in making the necessary arrangements.

The most serious objection I see to a meeting at a time other than that of the American Pharmaceutical Association is the great loss in drawing power of the programs which would result for both organizations. There can be no question that the opportunity of attending the meetings of the parent organization, and those of its numerous affiliates, offers an added incentive to teachers in the pharmaceutical fields. Separate meetings would tend to reduce the attendance and participation of our representatives not only at our own meetings, but at the meetings of the various sections of the American Pharmaceutical Association, and its affiliated groups. Any decrease in attendance would result in a marked loss of influence upon pharmaceutical affairs which we, as individual members of the American Pharmaceutical Association, could possibly exert. Furthermore, separate meetings of our organizations would be misinterpreted in many quarters as indicating a lack of unity in our purposes and objectives, and if this occurred it would be most unfortunate.

Please understand that, as I have already stated, any conclusions I have reached are entirely my own. You have the right to agree with them or to disagree. In either case, I hope you will discuss this issue fully because I believe it is of sufficient importance to justify very thorough and careful study before a decision is reached. There remains but one thing for me to do and that is to summarize my conclusions. These are as follows:



1. I believe that there is no possibility of the annual meetings of the American Pharmaceutical Association being held at any time other than the spring of the year.
2. I believe that the attendance at spring meetings held during the past decade has not been substantially lower than that of the August meetings held during this period, after making due allowance for factors influencing the attendance other than the time of the meetings.
3. I believe that in the future, if meetings are to be held in the spring of the year, existing records of attendance will be exceeded if deans and directors will give their support through greater effort in planning the teaching program and in providing increased financial aid for travel expense to the delegates.
4. I believe that it is unfair to schedule our meetings in August in conflict with the period traditionally devoted to vacation, travel, and relaxation by a majority of our teachers.
5. I believe that if separate meetings of our Association are to be initiated, we must be ready to assume the additional cost, now carried by the American Pharmaceutical Association, which such meetings would impose.
6. I believe that it would be unwise for us to give serious consideration to holding our annual meetings at a time other than that of the annual meeting of the American Pharmaceutical Association. We should not favor divorce or even a trial separation.

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*In a material age such as that through which we are now passing, professional education, along with all education, has felt the urge to adjust itself to materialistic demands, entirely forgetful of the high principles by which it alone should have been guided.*

Robert C. Wilson, Am. J. Pharm. Ed., 1, 16 (1937)

## BIOLOGICAL SCIENCES IN THE FIVE YEAR PROGRAM: PHYSIOLOGY, PHARMACOLOGY, FIRST AID, AND PUBLIC HEALTH \*

EWART A. SWINYARD

It is an honor to be invited to appear before you and a privilege to have the opportunity to express my views on the subject "Physiology, Pharmacology, First Aid, and Public Health in the Five Year Program."

Before proceeding with my presentation, I should like to congratulate the program committee on the topic selected for this morning's discussion. In my opinion the topic is very timely, and one which I hope will result in a unified effort to improve both the sequence and the level of instruction in the biological sciences. It is generally agreed that the pharmacist of the future will be characterized professionally by his general knowledge of the biological sciences, and anything we can do to strengthen this area of instruction will better prepare him for his profession. Dr. Bauch, United States Department of Health Education and Welfare, stated the problem in these words:

The ultimate purpose of the drugs the pharmacist handles is to modify, accelerate, decelerate, or inhibit the functioning of a cell, a tissue, an organ, or an organism. In order that he may intelligently and helpfully supply the materials to do this, it is essential that he know something about the physiology of cells, tissues, organs, and organisms, how these are modified by malnutrition or disease, and how they respond to drugs. Because it is the responsibility of the pharmacist to prepare dosage forms of medications which will most effectively present the medicinal agent, it becomes his responsibility to know the pathway by which drugs may be administered and the dosage form of each drug which is suitable for each pathway. Such knowledge calls for a substantial study of botany, zoology, pharmacognosy, anatomy, microbiology, physiology, biochemistry, and pharmacology.

If the above observations represent the ultimate purpose for which drugs are employed and accurately summarize the areas in which the pharmacist should be fully informed if he is to take his place as an intelligent and helpful supplier of these materials, it is obvious that the five year program should embody sufficient of the biological sciences to accomplish these objectives. Major attention should be focused upon developing

\* Presented to the Section of Teachers of Biological Sciences, AACP, Detroit, Michigan, 1956.

a logical sequence in the biological sciences area and upon raising the level of instruction in these disciplines. We should be more concerned with what we teach in this area rather than with a hunt for additional hours in which to teach it. With this thought in mind I would like to consider the role of physiology, pharmacology, first aid, and public health in the five year curriculum and to suggest how these disciplines should be integrated in this program.

Pharmaceutical education has developed to the point where it is virtually impossible to upgrade the quality of instruction in pharmacology until the level of instruction in physiology is improved. Most schools are currently devoting adequate time to the didactic portion of this course, but, unfortunately, few schools provide adequate laboratory training. The physiology unit, as recommended by the survey, should consist of sixty-four hours of didactic instruction and ninety-six hours of laboratory work. It is our intention at the University of Utah to require ninety-six hours of didactic instruction, twenty-four hours of recitation and seventy-two hours laboratory work.

The time has long passed when physiology, as usually taught in the arts and science schools, provides an adequate background for the student in pharmacy. The lecture material in this course should deal essentially with human physiology and should be concerned primarily with the function of cells, tissues, organs, and systems. If a course in pathology is not included in the curriculum, it should also consider in some detail various aspects of pathological physiology. The fact that drugs, in the majority of instances, bring about their salutary effects by amending abnormal physiological function justifies emphasis on this portion of the course. For example, following presentation of the physiology of the heart, the instructor could very well delve into the anomalies of function and of rhythm which characterize abnormalities of this organ. Likewise, the pathological states attending diseased conditions associated with other systems should be contrasted sharply with their normal physiological function. Such emphasis will set the stage for subsequent courses in the biological sciences and will provide a strong foundation upon which the instructor in pharmacology can build.

Laboratory work in physiology is imperative if we are to upgrade the training in pharmacology. This type of instruction is just as important to the effective teaching of physiology as it is to chemistry. Indeed, if the pharmacist of the future is to take his position among the medical confraternity as envisioned

by most educators, he is going to have to be better trained in basic human physiology, and student participation in physiological laboratory experiments is an indispensable part of this training.

With regard to pharmacology, I would say that in our institution we are developing a course of such a calibre that we can move into the five year program without much change. We are currently offering in this discipline 108 didactic hours of instruction, twelve hours of recitation, and 108 hours of laboratory. Next year we are to give 144 hours didactic instruction, thirty-six hours recitation and 108 hours laboratory work. Such an arrangement will provide four hours per week throughout the school year for lecture and one hour per week for the same period of time for group conferences. This does not include thirty-six didactic hours of instruction in vitamins and endocrine products. I believe we can do a good job with this distribution of time, and see no reason for further change when we embark on the five year program.

Courses in first aid are among the most recent additions to the pharmaceutical curriculum, but have already been accepted as important to the training of the pharmacist. Because of legal restrictions and the activities of national organizations, this area of instruction has been clearly defined and well organized manuals of instruction prepared. Instruction in this subject may well follow the outline prepared by the American Red Cross and consist of two courses: the standard course involving twenty hours of didactic and laboratory instruction, and the advanced course consisting of ten hours of didactic and laboratory instruction.

Public health, including preventive medicine, represents an area which should receive more serious consideration in the five year program. This area of instruction is common to schools of dentistry, medicine, nursing, pharmacy, social welfare, and veterinary medicine. Therefore, pharmacy should guard against the development of a "special breed" of public health courses which are peculiar only to schools of pharmacy. On the other hand, administrators would do well to interpret preventive medicine and public health in its broadest scope, and to organize, under a title acceptable to practitioners in this area, all the various courses which are often given quite independently of one another. For example, first aid could be offered as a part of one of these courses rather than as a separate course. This would permit the development of a sequence of courses in this area which should be presented at the same level as in colleges

of medicine and dentistry. Indeed, if we really believe that the "well informed pharmacist is the best single individual to disseminate information about public health," we should see to it that his training in this area is equal to that obtained by professional persons in the other health sciences. This can not be done by setting up special courses taught by untrained persons, but demands a sequence of courses taught by adequately prepared instructors.

What are the objectives of instruction in this area? Personally, I submit, with minor revisions, to the over-all objectives as stated by Dr. William W. Stiles of the University of California:

1. **Information** concerning the entire field of health should be presented so that the student will gain a clear insight into the multiplicity, magnitude, and specific nature of existing health problems. Furthermore, these should be considered in terms of the individual, family, community, nation and the world; and also in terms of the past, present and future. The student should also be informed of the action being taken to solve these health problems, with attention focused upon his own responsibilities as a professional, and the interrelationship which exists among the different professions.
2. **Attitudes** should be developed to direct the student's concern to both the individual and the community at large. He should become vitally interested in the prevention and control of disease and the promotion of health. He should develop a deep sense of service to others with a spirit of cooperation with all his professional associates.

How much training is required to attain these objectives? Blauch and Webster suggest a single course of forty-eight hours, whereas Dr. Stiles recommends 240 hours instruction over a continuous four year period. It is my considered opinion that three courses comprising approximately ninety-six hours of didactic instruction should provide adequate training in this area.

The titles and content of the courses which might be offered are as follows:

1. **Emergency Medical and Health Services**—a course which introduces the entire program for preventive medicine and public health, and then deals specifically with first aid, disaster operations, civil defense, military medicine, safety, accident prevention, and the control of all forms of physical violence. Such a course should be given in the first professional year and correlated perhaps with the study of anatomy.
2. **Applied Epidemiology**—a course which includes the general area of epidemiology, statistics, sanitation, nutrition and personal hygiene, including the biological products used in the

control of disease. This course could be given the second professional year and correlated with microbiology.

3. **Community Health Programs**—a course which deals with the social and economic aspects of health. It should give a clear insight into the health and welfare agencies at the local, state, national and international administrative levels—both official, governmental, and voluntary—and some comprehension of their individual programs.

It is realized that administrators will find it virtually impossible to include all of the courses suggested to them in the five year curriculum. Selection should be made on the basis of the needs of future pharmacists. Without taking anything away from the physical sciences, it seems pertinent to point out in closing that pharmacy, as practiced at the retail level, is becoming more and more a biological science. This fact must be taken into consideration in planning the five year curriculum.

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*... the franchise under which a profession operates and is thereby distinguished from secular activities is granted only under the assumption or theory that the profession will operate or function in the interest of society, and not in the interest of an individual or group of individuals.*

Robert C. Wilson, *Am. J. Pharm. Ed.*, 1, 16 (1937)

## LEVEL OF PHYSICAL CHEMISTRY IN THE UNDERGRADUATE CURRICULUM \*

T. HIGUCHI

I have been requested by our chairman to speak on the subject of "The Level of Physical Chemistry in the Undergraduate Pharmaceutical Curriculum." This topic, as you are all aware, is currently causing a good deal of acrid argument of both inter and intra school nature. The reason for this conflict lies not so much in any basic disagreement about course content but rather in the fact that we do not know what will be expected of our future pharmacists. In my presentation today, I would like to offer you my thoughts on this matter, and the nature of the physical chemistry course which would be indicated on this basis.

The level at which any course should be offered would be largely dictated by the purpose, the objectives served by it, and the extent and the nature of the use made of the material gained from the course. Such criteria cannot be applied, however, to pharmaceutical courses until the basic problem of the role to be played by our future pharmacist is settled. What area of scientific knowledge will be his professional obligation? What will he do? What can we expect of him? These are questions we must answer before we can turn to subjects such as I have today.

Historically, the position is quite clear. In *Remington's Practice of Pharmacy* (10th edition) we find a classical definition of pharmacy:

Pharmacy is a science which treats of medicinal substances. It embraces not only a knowledge of medicines, and the art of compounding and dispensing them, but also their identification, selection, preservation, combination, analysis, and standardization.

The title Pharmacist is conferred upon a person who demonstrates that he is scientifically and professionally capable of engaging in a practice of pharmacy.

From without the profession, we find another definition in *Webster's New International Dictionary*:

Art of practice of preparing and preserving drugs, and of compounding and dispensing medicines according to prescriptions of physicians; the occupation of an apothecary or a pharmaceutical chemist.

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\* Presented to the Section of Teachers of Chemistry, AACP, Detroit, Michigan, 1956.



These classical definitions of the science and profession of pharmacy appear to be too narrow and unacceptable to many of us here. We have, for example, a statement in the general report of the last survey in this vein, referring to the pharmacist's changing job:

The individual pharmacist became (is) less a compounder of medicinals and more a scientific purveyor and technical advisor.

More recently the feeling that retail druggists must play the part of neighborhood consultant pharmacologists in order to survive has found increasing support. Dean Orr, at the previous meeting of this group at Miami Beach, for example, underlined the importance of this new role of the pharmacist as a physician's advisor.

In view of this apparent decline in the pharmacist's role as a compounder of medicine, many pharmaceutical educators are strongly inclined to de-emphasize his physical science and technological training. The point is often made of the small proportion of prescriptions requiring technical knowledge in their filling. It has been suggested, on these bases, that less and less stress be laid on purely pharmaceutical matters, and that added materials of more medical nature be included. Such an attitude, I feel, presupposes either that the science of pharmacy no longer exists as a separate scientific discipline or that pharmacists need not be trained in the art and science of pharmacy.

I do not subscribe to this approach. My reasons are many, and I have only a little time. In the remainder of my presentation, I have adopted the position that,

- 1.) Pharmacy is a science as defined, for example, by Webster,
- 2.) Graduates of schools of pharmacy must be firmly grounded in pharmacy.

Pharmacy in its classical sense is largely a physical science, the science of compounding and formulating chemicals into pharmaceutical dosage forms, and of preserving and distributing them. In the narrower sense, the pharmacist is not concerned with the biological activity of a drug once it reaches its site of action. This is the realm of the pharmacologist. He is not concerned with the synthesis of the drugs. This is the job of the organic chemist. In performance of his own duties and in order to understand the efforts of his industrial colleagues, I feel strongly that the future pharmacist must rely more and more on his physical science background.



The basic course in which our pharmacy student can best integrate and digest his physical sciences is physical chemistry. Physical chemistry is for this reason as fundamental to pharmaceutical courses and practices as organic chemistry is to the pharmaceutical chemist, and physiology is to the pharmacologist. The concepts, the theories and the methodology of physical chemistry, are the daily tools with which a pharmacist must work.

A superficial course in this basic subject is insufficient. A nonquantitative, descriptive presentation is hardly likely to prepare the student for the science of pharmacy. I advocate a rigorous, basic course in physical chemistry for all pharmacy students, an unemasculated course with thorough mathematical and theoretical treatment of elemental concepts. Theories of gases, liquids, and solids; thermodynamics; and the physical chemistry of chemical equilibria both in homogeneous and heterogeneous phases should be treated as fully as in courses designed for chemistry students.

The only serious objection to this approach has been that the mathematical preparation of our students would be inadequate for such a beginning course. This is, however, not an insurmountable obstacle. For the past several years I have advocated a four to five credit course in physical chemistry for the pharmaceutical curriculum. Two credits are to take the form of small quiz sections meeting twice a week and devoted to introducing the students to such higher mathematics as would be required. Lectures on physical chemistry would make up the rest of the credits; problems and questions arising from this part are also to be covered and discussed in the quiz sections.

Some have maintained that it would be unrealistic to expect our students to master calculus for our pharmaceutical courses. It is my position that such differential and integral calculus that may be required in physical chemistry can be easily taught in less than ten classroom hours, provided the students already have an adequate background in algebra. Differentiation of  $x^a$  and  $\ln x$  and the corresponding inverse process are all the calculus we need to cover the basic material. Although mastery of more complex functions, including trigonometry functions, is desirable, it would in no way help to understand the fundamental physical chemical concepts. This limited amount of calculus would, however, provide a firm and sound foundation for our pharmaceutical courses. Full understanding of such important phenomena as diffusion, membrane permeation, chemical kinetics of drug breakdown, vapor pressure, electrode potential,

melting, solubility, thermodynamic potential, Brownian movement, concentration gradient of suspension arising from thermal effects, crystal growth and nucleation, etc. become possible with this little added amount of mathematics.

If pharmacy is a science as well as a profession, we in the field of pharmaceutical education should be the last to arrange its funeral. Without the basic background required to keep it on the same level as other applied sciences we may find that we have given up all that we could claim for pharmacy as a science for the questionable, unpaid, self-appointed role as physicians' helpers.

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*... an increasing number of young men and women, who, because of the failure of the school to inculcate proper conceptions of ideals, adjust themselves to existing conditions and practices as they find them in the field, and thus continue the vicious circle.*

Robert C. Wilson, *Am. J. Pharm. Ed.*, 1, 17 (1937)

## THE TEACHING OF A COURSE IN RADIOISOTOPE TECHNIQUES \*

C. E. MILLER

The evolution of the Atomic Age is well known to all of us. Hardly a day goes by without some announcement pertaining to developments in radioactivity or radioisotopes. History tells us that during the month of August, 1946, the first shipment of reactor-produced radioisotopes was made. A decade earlier marked the first administration of isotopes to humans. Since that time vast strides have been made in the application of isotopes to medicine, as well as to other modes of living. We know, in spite of all the publications and information releases, that the surface of possible pharmaceutical application has hardly been scratched. We of the teaching profession certainly are cognizant of the importance of keeping the pharmacists of tomorrow abreast of current developments such as the application of atomic energy to the field of pharmacy.

With this thought in mind and prompted also by such pertinent points as: (1) recognition of Sodium Radio Iodide by the USP 15; (2) the need for hospital pharmacists with training in the field of radioisotopes; (3) the role of the pharmacist in national emergency resulting from A or H bomb; and (4) the need for graduate students with a working knowledge of the subject has demonstrated to us the necessity for the inauguration of a course at the senior level in radioisotopes which will most nearly fulfill these needs.

We are not the first school or college of pharmacy to offer such a course. Purdue University and the Philadelphia College of Pharmacy may be mentioned as pioneering in this area. I am certain that there will be many other schools which will soon have course work of their own.

What kind of a course should be offered? Much time and thought should be given to this question. In addition, close collaboration with service school courses should be maintained. All of us, I am certain, will agree that we do not want to make atomic physicists of our students, nor do our students have a background which would fit them for that field. On the other hand, our students must have a reasonable background of physics so that a general survey course in isotopes would not be

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\* Presented to the Section of Teachers of Chemistry, AACP, Detroit, Michigan, 1956.

beyond their comprehension. In addition, an adequate background in inorganic chemistry and mathematics through trigonometry is certainly essential.

Another important and sometimes overlooked fact is the type of physical plant in which such a course can be safely and properly presented. One must keep in mind that, while it may be an easy matter to provide safe and adequate facilities for one or possibly two persons to carry on investigational work using isotopes, a class of the size of our present-day senior year in pharmacy poses a problem of major concern.

That a course in radioisotopes is expensive needs no elaboration from me. I am confident that all of you have, from time to time, checked catalogs and watched the cost trends with respect to equipment for isotope work.

We have considered all of these factors and in addition many others which have been brought to our attention. We are of the opinion that local circumstances should govern the conditions associated with such a course. The course which our students take during their senior year is of four credits, three of which are didactic and one laboratory.

The material which will be covered in this course follows in a general way the instruction offered by other schools and the Institute of Nuclear Study at Oak Ridge, Tennessee. It is not within the scope of this paper to discuss equipment requirements.

The role of the pharmacist in civil defense is also considered. The instruction given relative to this phase of the course is made as practical as possible and deals with the problems that would confront the pharmacist in his or her community if it were subjected to an attack with nuclear weapons.

The subject matter is covered in as simple and non-technical a manner as possible. Proper use of instruments to detect and measure radioactive contamination is explained and their use demonstrated. The salvage and decontamination of food and drug stocks is considered. The problems of maintaining usable drug supplies after widespread destruction and mass evacuation are considered.

Lectures, slides, and movies are used in explaining the nature of the danger from radioactivity and fall out and the destructive power of nuclear bombs.

We recently have been fortunate in obtaining, on allocation from the Federal Civil Defense Administration, six monitors for instructional purposes, as well as other equipment for the civil defense instruction. I am mentioning this as a suggestion

to those of you from other states who may be able to obtain similar allocations.

We are indeed fortunate in having on our staff personnel who have had isotope training in their respective fields, and they will be utilized as guest lecturers during the quarter. In so far as textbooks are concerned, in my opinion, there is no one book adequate as a text, and recourse will be made to government bulletins, technical journals, and reference books for particular phases of instruction.

The following outline may be considered of a general nature and is given to you as a guide, keeping in mind that individual schools will undoubtedly want to make changes to meet their own needs.

Lecture:

1. Historical background
2. Terminology
3. Radiation hazards and their control
4. Properties of isotopes
  - a) Physical      b) Chemical
5. Production of isotopes
6. Analysis of isotopes
7. Application of isotopes
  - a) Medicine      c) Industrial
  - b) Chemical      d) Agricultural
8. Procurement of isotopes and governing regulations
9. Health physics and radiation poisoning
10. Legal aspects
11. Personnel training in detection of radioactivity
12. Disposal of waste material and decontamination
13. Packaging of isotopes
14. Design of radioisotope laboratories
15. Availability of government publications
16. Damage that "A" or "H" bombs can do
17. Why radiation isn't good for us
18. Radioactivity in drugs
19. Sanitary problems

Laboratory:

1. Visual aids

The following list of films from various branches of the Army Signal Corps are 16 mm, sound, black and white; others are in production. The length of time varies from 35 to 60 minutes.

- |   |  |
|---|--|
| a) <i>Fundamentals of Radioactivity</i>   | j) <i>General Sciences</i>             |
| b) <i>Properties of Radiation</i>         | k) <i>Industry and Engineering</i>     |
| c) <i>Measurement Procedures</i>          | l) <i>Agricultural Research</i>        |
| d) <i>Methodology</i>                     | m) <i>Stable Isotopes</i>              |
| e) <i>Radiological Safety-Principles</i>  | n) <i>Radioactive Contamination</i>    |
| f) <i>Radiological Safety-Practice</i>    | o) <i>Operation Greenhouse</i>         |
| g) <i>Biological Effects of Radiation</i> | p) <i>Atomic Attack</i>                |
| h) <i>Medical Research</i>                | q) <i>Primer on Monitoring</i>         |
| i) <i>Diagnosis and Therapy</i>           | r) <i>Basic Physics of an "A" Bomb</i> |

2. Decontamination \*
  3. Measurement of radioactivity \*
  4. Sampling of radioactive material \*
  5. Monitoring
  6. Ion exchange columns \*
  7. Isotope uptake \*
  8. Isotope distribution in animal tissue \*
- \* Demonstration at undergraduate level.
- 

*A professional school does not justify its existence and maintenance if it concerns itself only with curricula and other mechanical details, and at the same time fails to assume leadership in its respective field.*

Robert C. Wilson, Am. J. Pharm. Ed., 1, 18 (1937)

## SYMPOSIUM: TRAINING AND INTERNSHIP IN HOSPITAL PHARMACY \*

### STATEMENT OF THE PROBLEM

LOUIS C. ZOPF

By definition of title I am asked to state the problem which confronts the member colleges of this Association with regard to graduate training for hospital pharmacy.

It is unnecessary for us to discuss when hospital pharmacy changed from a position of minority to a specialization of major consideration. It is of concern to this group, however, that we make certain of the continuation and expansion of this area by placing it on a firm graduate training basis. Several of our colleges offer graduate instruction in the field of pharmacy, pharmaceutical chemistry, pharmacognosy, and now some colleges offer programs in administrative pharmacy. Their experience with graduate instruction will be valuable as a guide for the discussion of this symposium. Establishing a sound academic program for graduate instruction in hospital pharmacy should not be difficult if we recognize the needs of the specialty and profit from the experiences of individuals now responsible for established programs. This area of pharmaceutical specialization differs from other phases of pharmacy because it requires an internship training experience associated with a sound academic program. Experience and training are valuable tools of learning, and therefore we will draw most heavily on those of our members who have had the greatest experience.

I have been asked to define the problem which exists. The first problem or hurdle seems to be one of recognition for the specialization, and an understanding of the growing demand and need for personnel qualified in this area of pharmacy. We must come to a mutual understanding of the definition of hospital pharmacy. For sake of brevity and documentation, it is of value for me to quote the findings and feeling toward hospital pharmacy practice in *The General Report of the Pharmaceutical Survey*:

The pharmacist engaged in hospital practice holds a most, if not the most, strategic and important position in the entire field of professional practice. By virtue of the environment in which he practices, demands are made upon his professional and personal

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\* Presented to the Section of Teachers of Graduate Instruction, AACP, Detroit, Michigan, 1956.

abilities, which indeed represent a challenge. The proper discharge of his duties, as well as his success in what is a vital public relations responsibility, affect not only his hospital, its patients and staff, but reflect sharply on the profession outside the hospital's walls.

The daily contact with physicians, and particularly with young physicians, gives him an unequalled opportunity to provide professional assistance and to furnish information without bias concerning drugs and drug preparations.

We must resolve our differences of definition and accept as fact the specialized training requirements of pharmaceutical practice within a hospital. Here the pharmacist must be especially competent in pharmacology, extremely conversant with biochemistry, pathology, and the practical applications of these biological sciences. He must have an understanding of medical terminology and an acquaintance with medical specialization which exceeds that needed by the average pharmacist. His professional requirements must extend beyond the ability to handle routine compounding and pharmaceutical manufacturing, for the formulation and the custom designing of products especially for a hospital will be important. In hospitals having a nursing school or associated with other teaching units of the health sciences, the pharmacist will be called upon to assist with the educational program.

According to these demands, we immediately recognize the need for a person who is competently articulate. B. Lamar Johnson in *General Education in Action* points out that Mr. Average Citizen is deluged with a torrent of words. Members of his family, radio announcers, newspapers, teachers, billboards, sales agencies, and other media bombard him with words during a large part of his waking hours. The ability to understand words and their implications is at the very heart of successful living. Receiving and comprehending the words of others through listening and reading are only part of the process of communication. Equally important is the ability to express one's self through such varied activities as conversing casually with friends or speaking formally with business associates; writing personal letters or composing detailed reports; listening intelligently and responding appropriately; taking notes, filling out forms, sketching, and using any number of other means of communication, most of which involve words or symbols for words. The transition of our individual into an environment of total professional association will demand an articulate individual capable of expressing himself orally and literally.

Associated with the professional demands, a hospital pharmacist also finds that a part of his duty is to understand admin-



istrative procedures of the institution, and especially those of the area of his responsibility, the pharmacy. It is unrealistic to believe that his reliance upon the introductory administrative course at the undergraduate level will furnish him adequate training for the understanding of sound economic principles as applied to hospital operations.

A statement of the case, then, can be resolved as follows. The American Association of Colleges of Pharmacy has a definite and logical interest in the development of this phase of pharmaceutical education. We have offered personnel from our Association to work with the membership of the American Society of Hospital Pharmacists, the American Pharmaceutical Association, the American Hospital Association, and any other organization concerned with the training of personnel in this field. We continue to insist that hospital pharmacy is an area of pharmaceutical education, and that, therefore, the voice of our Association should be heard.

In summary, the problem can best be delineated as follows. Hospital pharmacy, because of its accelerated development, requires critical review that replaces enthusiasm and emotion with judgment and clear thinking. Pharmaceutical educators must insist, for the benefit of pharmacy itself, on an academic program of quality, emphasizing the need for expansion of the individual's training in the areas of pharmaceutical product development, pharmacology, therapeutics, biochemistry and pathology, and the desirability of a broader basis upon which to place the requirements of economic practices in the administration of pharmaceutical operations as they pertain to the hospital.

The internship training program must be designed to permit diversification of experience, to offer opportunity of training in inpatient service, outpatient service, manufacturing and packaging, surgery, compounding and dispensing, sterile products development, and technical formulation considerations.

The standard or level of training for the academic portion of this program is important. The product of our graduate training must be an individual who is professionally as well as academically acceptable. The supervision of the internship portion of the program must be directed by a qualified individual. Herein lies one of the basic difficulties. Hospitals are anxious to adopt internship arrangements, but some are unwilling that the college of pharmacy have any academic privilege or guidance of the internee. This portion of the training program cannot be permitted to degrade into a "cheap help" arrangement. For the

program to bear fruition, the hospital should agree that the supervising pharmacist be permitted to serve on the faculty of the college of pharmacy where he can consolidate the ideas between the academic and the practical portions of the individual's training. The attribute of manual dexterity, although important in such a program, does not necessarily define a qualified person. Understanding of the principles involved is of primary consideration.

The importance of the problem cannot be underestimated. Without question, what pharmaceutical education does to establish a firm, sound program in this area will reflect on the entire profession for years to come.

#### INTERNSHIP IN HOSPITAL PHARMACY

W. ARTHUR PURDUM

Hospital pharmacy has grown up. Great strides have been made in the profession during the last ten or fifteen years and much of this progress may be attributed to the efforts of the American Society of Hospital Pharmacists. This year marks the tenth anniversary of the annual hospital pharmacy institutes, and many hundreds of pharmacists in hospital practice have benefited immeasurably from these concentrated short courses. Even though institutes have helped to improve the calibre of hospital pharmacy, there still exists a definite shortage of well-qualified pharmacists for practice in hospitals. To aid in alleviating this shortage, a number of forward thinking pharmacists have established internship or residency programs in their hospitals. Today there are approximately forty programs in existence. The majority of these consist of a year of organized, well-rounded training or practical experience under the supervision of a competent and experienced pharmacist. The remainder of the available programs combine this training with a year of academic work leading to the Master of Science degree.

With the advent of five year and six year curriculums in our schools of pharmacy, I can foresee a collapse or, most certainly, a partial collapse of our programs of internship associated with graduate study. After the five year course becomes mandatory, it is highly improbable that many students will see fit or can afford to take two additional years for an internship in a hospital plus academic work leading to the M.S. A reasonable manner in which to meet this problem is to make courses related to hospital pharmacy available during the fourth and fifth years of the five year program; and the student, thus prepared, upon graduation could enter intern-

ship in a hospital. We must therefore prepare the student for an internship at the undergraduate level.

What courses should be offered? I propose courses in hospital administration, hospital pharmacy administration, central sterile supply administration and operation, and in pharmaceutical manufacturing and control. A credit or two in research and a thesis are desirable if they can be crowded into an already crowded curriculum.

The hospital administration should be an orientation course designed to give the student an over-all picture of the whole operation of a hospital, and should preferably precede the course in hospital pharmacy administration. It should consist of a minimum of sixteen hours of lectures, although thirty-two would be more desirable.

The ASHP has already drafted and published a good syllabus for the course in hospital pharmacy administration, and this is being used currently by many of the colleges.

Now completing its second year, the ASHP has a special Committee on Pharmacy Operated Central Sterile Supply. This Committee presented a draft of a syllabus for a course in central sterile supply administration at the Miami meeting last year. Since then, the material has been reviewed, improved upon considerably, and will be presented to the Society again in the report of that special Committee at this convention.

The courses in manufacturing and control are already offered by many of the schools. These may be offered as one, two, or three courses. For example, one college may prefer to offer a course in non-sterile manufacturing, a second in sterile manufacturing, and still a third in manufacturing control. Another may prefer to combine non-sterile and sterile manufacturing into one course and separately offer a course in control. As another alternative, all three subjects may be combined into one course.

Because of time limitations, the research could not be more than an introduction to scientific investigation. It could take the form of a library assignment, perhaps a laboratory problem in product development or product improvement or the problem might be along administrative lines.

It is important, however, that the student be offered an elective in hospital pharmacy. Already, the University of Maryland has planned to offer three directions in which a student may turn, namely, a hospital pharmacy major, a retail pharmacy major, and a pre-graduate major.

Until now, internship programs have operated without any form of centralized control. A system of accreditation now appears to be close to a reality, and this will undoubtedly result in higher stand-

ards and better pharmacists. It is true that we have had a minimum standard for pharmacy internships in hospitals for a half dozen years, but this has served only, though well, as a guide for self-appraisal by internship program directors.

This standard requires that the internship consist of a minimum of 1,920 hours of supervised training. Experience must be gained in inpatient dispensing, outpatient dispensing, manufacturing, and in departmental administration. Experience in the operation of the central sterile supply department should be included and probably will be incorporated in a future revision of the standard.

I repeat—hospital pharmacy has grown up.

#### UNDERGRADUATE TRAINING IN HOSPITAL PHARMACY

TOM D. ROWE

As we might expect at a session of the Teachers of Graduate Instruction, the papers you have just heard dealt primarily with problems pertaining to graduate work. In order that there may be no misunderstanding and to insure that my remarks will not be misinterpreted, I want to emphasize the fact that my paper deals with undergraduate education in hospital pharmacy. My remarks are not to be construed that there should be a lessening of our efforts to strengthen the graduate programs. I am presenting some ideas which, I hope, may be helpful in solving the general problem of hospital pharmacy education.

Today should be recorded as a significant date for hospital pharmacy and for pharmaceutical education. It marks the first time that the American Association of Colleges of Pharmacy has devoted an entire session of one of its important teachers' conferences to this field. It is one of the few times that papers concerning hospital pharmacy have been included in the AACP program.

The lack of greater recognition of hospital pharmacy by colleges and the lack of closer cooperation between organized hospital pharmacists and pharmaceutical educators have been decried for several decades. E. C. Austin, a hospital pharmacist, discussed this situation thirty-five years ago when he wrote about it in 1921 in the *Journal of the American Pharmaceutical Association* (1). Many hospital pharmacists and educators have written about it since that time.

According to a survey of the colleges made by Dean Spease (2) in 1938, only thirteen schools out of forty-eight which answered a questionnaire were doing anything about training hospital pharmacists. A similar survey made by Dean Rudd (3) in 1941 showed

that only fifteen or sixteen of the forty schools which replied were active in giving some type of undergraduate training in hospital pharmacy. Both Dean Rudd and Dean Spease urged the colleges to show more interest and activity in this area. Although recognition of hospital pharmacy may seem to have been slow in coming, it appears that the urgings of Austin, Spease, Rudd, and others have not been in vain. This meeting attests to that.

Why has this recognition been so slow in coming? No doubt there are many reasons, including the relative newness of hospital pharmacy as an important branch of the profession. There are, however, to me at least, two other major reasons. One is that since 1942 (4) the hospital pharmacists have officially had their own organization. Even prior to that time they were actively engaged in organizational plans. We are all familiar with the growth of this splendid organization and its many fine contributions to pharmacy. Nevertheless, because of many problems encountered in the organizational period from 1921 to 1942 and the efforts to raise hospital pharmacy standards since that time, little attention was directed to educational problems until very recent years.

These remarks are not intended to be critical of the American Society of Hospital Pharmacists but are merely stated as a reason for lack of closer cooperation with educators. Because the hospital pharmacists were organized and doing a good job, we in education left them pretty much on their own. Now that many of their major problems are approaching solution they should find more time to work on instructional programs. They cannot do the job by themselves and must work closely with the educators. The educational side of hospital pharmacy will certainly be better off in the long run because of the pioneer work of the ASHP.

The second reason for the delay has been the scarcity of well-qualified hospital pharmacists within the educators' circle. We have had a number of interested individuals, though not necessarily fully qualified, on our faculties, but they needed guidance to be of help. Even today this situation exists. There are probably not more than a dozen schools with full-time faculty members who have had training and experience in hospital pharmacy. We have lacked and continue to lack personnel who can guide us, and who can fight for strong instructional programs in hospital pharmacy. Unless a faculty has someone who is interested in this field and willing to devote time and effort to it, the program in hospital pharmacy is not likely to develop properly. If we were to examine those colleges which are doing a good job in hospital pharmacy education, I think we would find in many of them that the chief pharmacist, with a part-time faculty appointment, is primarily responsible for selling the

idea to the dean. It is to be hoped and expected that in future years there will be more faculty members who have a good background in hospital pharmacy.

While recognition and progress have been slow, there definitely has been an increase of interest on the part of the colleges. In preparing for this paper the writer sent a questionnaire to all of the member colleges. This questionnaire dealt only with undergraduate laboratory instruction utilizing pharmacy facilities of hospitals, outpatient clinics, and student health services. Whereas in Rudd's 1941 survey only 37.5 per cent of the schools answering gave any work in this area, in 1956, thirty-four out of seventy schools, or nearly 50 per cent of those which answered gave some laboratory instruction in this specialty. (Of the thirty-four which indicated activity, six were in student health only and twenty-eight actually gave hospital pharmacy training.) Twelve of the schools which indicated on the questionnaire that they did not give laboratory instruction in hospital pharmacy, do, according to the catalogues, give lectures in this area. Thus at least forty-six of the schools of pharmacy, or slightly over 60 per cent, give some type of instruction in hospital pharmacy. This number may be somewhat higher if any of the six schools which did not answer the questionnaire give any type of instruction in this field.

While we have not doubled percentage-wise in the number of schools active in this area, we have, because of more schools now in existence than in 1941, more than doubled the number which were offering some type of course work in hospital pharmacy in 1941. All of these figures apply to undergraduate offerings only.

Before leaving the quantitative aspects of the offerings in this field a few more results of the 1956 survey should be noted. Of the schools now giving laboratory work in this area, eleven indicated they planned to expand their programs. Of those not now teaching in this field, ten stated they expected to introduce instruction in hospital pharmacy including laboratory work, some in the immediate future, others at a considerably later date. Thus expansion and interest in this field continues to grow.

Herbert L. Flack, in a paper presented at the 1955 Teachers' Seminar on Pharmacy, gave figures indicating that in 1954 the total number of schools offering laboratory or lecture or both in hospital pharmacy was 50 per cent of the AACP membership. In presenting these figures and those of a survey made in 1949, he said, "A review of recent statistics, however, makes one take a second look at any statement made to the effect that educators have accepted hospital pharmacy practice as a distinct and rapidly growing specialty of pharmacy" (5).



On the contrary, I think the fact that nearly two out of every three of our schools are now offering some type of undergraduate instruction in hospital pharmacy is strong testimony to recognition within the colleges of this important and rapidly growing area of pharmacy practice. Frankly, I was surprised to find in my survey that so many schools were active in this field. I can understand Mr. Flack's concern and his desire to have 100 per cent participation, but if experience in other fields of pharmacy specialization is any criterion, neither he nor I will live long enough to see the 100 per cent goal accomplished. With all the effort expended on pharmacy administration, we are still short of the 100 per cent recommended activity. The same is true in laboratory work in pharmacology and possibly other formerly neglected areas.

Even more important, however, than this quantitative measurement is the qualitative measurement of the work being given. If we study the comments made on the questionnaire, catalogue statements, and remarks made in various articles, it is doubtful that we can conclude that the quality in many instances is equal to that of the standard or required courses in pharmacy. One dean in referring to the hospital pharmacy training at his school said, "There is a limit on the amount of work to be done and regular pharmacy personnel to give the necessary supervision." Unless adequate supervision is available the teaching value of such work is likely to be low. In fact, the students unless taught as they work may become just another pair of hands for routine performance.

Another dean stated, "Our weakness in hospital pharmacy is that our laboratory work is not supplemented by adequate didactic instruction. We plan to remedy this in the future." This lack of didactic instruction is true in many cases and is an omission to be overcome. Laboratory instruction in hospital pharmacy without accompanying lectures is apt to be meaningless unless carefully planned. Blauch and Webster (6) in *The Pharmaceutical Curriculum* commented on this situation as follows: "In numerous instances the courses include a great deal of compounding and dispensing. Certainly compounding and dispensing are an important part of a hospital pharmacy service, just as they are of pharmacy service generally, but it would appear that emphasis in a course in this field should be upon the development of hospitals, their place in society, the importance and place of pharmacy in hospitals, the administrative and policy-making aspects of the pharmacy departments, and the relationships of the pharmacy to the many other components of the hospital. To incorporate in the course large elements of compounding and dispensing is likely to place emphasis on routine manipulative procedures and to result in only cursory



treatment of the broader demands and aspects of pharmaceutical service in hospitals." As a further indication of possible lack of quality in either the didactic or laboratory course or both, Blauch and Webster state: "From a study of the descriptive statements in the catalogues it appears there is considerable confusion and no general agreement among colleges as to the purpose of a course in hospital pharmacy."

It would appear from these sources of evidence that considerable improvement in the quality is needed. It would seem, then, that our immediate objective in this field would be to bring the quality of hospital pharmacy courses up to the level of the other pharmacy subjects. Lack of faculty qualified in hospital pharmacy will make accomplishment of this objective more difficult than raising the quality in courses for which qualified personnel are already available. We must, then, make certain that schools engaged in hospital pharmacy have faculty members who can do the job. Those responsible for this area must make a study of it to find out what type of job should be done and prepare themselves to do it.

Once the personnel is available the quality of the courses will improve. This improvement will not be automatic, but will be developed by applying suggestions which have been made by hospital pharmacists and educators experienced in this field. In order to aid in solution of this problem the AACP should activate a special Committee on Hospital Pharmacy Education. I think this committee should be composed of hospital pharmacists who are engaged in teaching and full-time faculty members who are experienced in this area. The committee should be charged with the responsibilities of designing programs for undergraduate training in this field, including syllabi for suggested courses. While a committee of this name made a report at Miami Beach last year, it did not deal in detail with the specific problems of undergraduate programs in hospital pharmacy and is no longer active. This new committee could also work on graduate programs, but I am concerned primarily with undergraduate work, inasmuch as my assigned topic is in that area.

Until such a committee has specific suggestions to make, there are certain points most schools could well consider now in efforts to improve the quality of the courses. If they are now giving laboratory instruction only, they might well give thought to adding some didactic work. The addition of at least one hour of lecture per week will make the laboratory work more meaningful. It is important enough for the lecture work to be included that time for it, if necessary, could probably be taken out of the time now allotted for laboratory. For this lecture work the "Syllabus for

a Course in Hospital Pharmacy" presented in the May-June 1955 issue of *The Bulletin of American Society of Hospital Pharmacists* (7) can be used as a guide. This syllabus is too inclusive for a beginning undergraduate course, but it has information which can be useful in designing a lecture series for undergraduates. The material covered can also be presented by those schools not engaged in laboratory instruction.

It should be kept in mind that the undergraduate training in hospital pharmacy, as now generally taught, has as its primary objective to orient the students in hospital pharmacy and to help them determine if they wish to become hospital pharmacists. Consequently, the lecture work is essential if the students are to have an over-all understanding of a hospital pharmacy operation.

By the use of optional curriculums it will be possible to go farther than hospital pharmacy orientation in the extended program. Mr. Flack, in his paper referred to earlier, suggests specific courses to be given to undergraduates when the five year program is in operation. Among these are touch typing, increasing reading speed, and personnel supervision. While skill in these areas is no doubt useful, I do not think courses of this sort should be included in any pharmacy curriculum. Critical evaluation of such recommendations from practicing hospital pharmacists by the proposed Committee on Hospital Pharmacy Education would be helpful. Mr. Flack and his colleagues in hospital pharmacy and the pharmaceutical educators need to work together in reaching conclusions respecting curriculums. With more help from us the suggestions by the hospital pharmacists can be developed to fit better into the educational programs. The AACP Executive Committee is aware of this need and is eager to work with the ASHP.

Hospital pharmacy education is one of our most rapidly expanding fields to which the colleges must pay special attention in the immediate future. We in education have too long let it develop without our organized assistance. It is time we now studied this problem critically with all the expert opinion we can assemble. Only by careful study and planning can we make sure that the courses taught in the future will be of high quality and designed to meet the needs of students entering this field. It is doubtful that graduate programs in this area can ever supply all of the hospital pharmacists needed. Furthermore, it would be unfortunate for large numbers of schools without adequate hospital connections and properly trained faculty to enter this field on the graduate level.

We must, therefore, turn to the undergraduate programs to supply the manpower needed. Some schools by necessity and some

by choice can be expected to offer orientation programs only. Many others can and should develop strong undergraduate curriculums with the objective of qualifying students for hospital pharmacy work. Unless the AACP and the ASHP join hands in a determined effort to see that this is done, we will lose a golden opportunity to help develop the profession.

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(A professional school) . . . fails if it is not manned by individuals of broad vision, who have, not only a deep love for their profession and an intimate knowledge of its problems, but, who also have the proper conception of any responsibility for a real spirit of service; and (it fails) if it does not imbue its students with these ideals of and responsibility for service to society rather than for personal gain.

Robert C. Wilson, *Am. J. Pharm. Ed.*, 1, 18 (1937)

## REPORT OF THE COMMITTEE TO STUDY THE COURSE IN PRINCIPLES OF PHARMACY \*

At the 1954 meeting of the AACP, C. O. Lee and P. F. Belcastro recommended that a committee of the Pharmacy Teachers Conference be appointed to study the beginning course in pharmacy usually entitled "Principles and Processes of Pharmacy." The Conference accepted the recommendation, and the chairman of the Conference appointed the chairman of the committee and instructed him to select the membership of the committee.

Seven members of the Pharmacy Teachers Conference accepted appointment to the committee. A questionnaire covering the material usually included in the beginning pharmacy course was prepared and distributed to the teachers of pharmacy in the seventy-six member schools of the AACP with the request that it be filled out by the pharmacy teachers of the various institutions.

Completed questionnaires were returned from sixty-six schools, a response of 86.8 per cent.

Fifty-eight of the reporting schools are currently operating on a four year program, seven schools on a required five year program, and one school on a required six year program. Several schools reported an optional extended program; but, since this information was not requested, no tabulation was made of these replies since such a tabulation would not give a complete picture on optional extended programs. Three schools are operating on a one-four sequence and four schools on a two-three sequence. The six year program operates on a two-four sequence.

Thirty-nine schools reported a separate course in principles and processes of pharmacy embracing an appreciable number of the topics listed in the appendix of this report. Twenty-seven schools reported that they do not offer such a course. Of the eight schools operating on a required extended program, four offer such a required course and four do not.

The number of the clock hours of lecture and laboratory as well as credit hours was determined from the reports on the questionnaire. A detailed compilation of this information is given in the appendix.

Thirty schools reported that the course is offered in the first professional year of the program, seven offer the course in the

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\* Presented to the Section of Teachers of Pharmacy, AACP, Detroit, Michigan, 1956.

second professional year, and one in the third. The question was not answered in one instance.

Nineteen schools reported that some work in orientation and/or history of pharmacy is included in this course, varying from three clock hours to twenty-two clock hours and averaging eight to nine clock hours. Eighteen schools do not include this material in the course, and two schools did not report on this question.

Eighteen schools report that some pharmaceutical arithmetic is included in the course, varying from two clock hours to thirty clock hours, and averaging ten clock hours. Twenty-one schools reported that arithmetic is not included in this course. Thirty schools reported that a separate course in arithmetic is required. This information was not solicited from those schools which do not offer a separate course in principles and processes as it was not considered within the scope of this committee assignment.

One item in the questionnaire was designed to determine the prerequisites and corequisites for the course. Due to the differences in level at which the course is offered and the difference in level at which service basic science courses are taught in the various schools, it is difficult to evaluate the answers given. A list of the courses listed in these categories is given in the appendix to this report.

Four schools reported that the course has been dropped from the curriculum within the past seven years. Twenty-two reported that the course had been integrated with another course. In the majority of instances, this integration has taken place within the past seven years, but two schools reported that the course material had been integrated more than fifteen years ago. One school reported that such a course had never been required. Five schools volunteered the information that the material had been partially integrated in recent years; but, since the question of partial integration was not included in the questionnaire, a larger number of schools may have integrated some of the material into other courses.

In twenty instances, the material was integrated into the preparations course, in five into prescription practice, and in twelve into other courses including: metrology, physical pharmacy, quantitative analysis, organic chemistry, advanced theoretical pharmacy, orientation, inorganic medicinal products, and physics. A number of schools reported that the material had been integrated into more than one course, thus accounting for the thirty-seven designations for the twenty-two schools reporting integration.

Thirteen schools reported the opinion that the majority of topics listed in the questionnaire are adequately covered for pharmacy students in the courses in chemistry and physics in their institutions. Forty-three reported that they did not think so, seven reported that

they probably were, and three did not know. Twelve schools reported that the chemistry and physics courses were taught by members of the pharmacy staff, and, in this category, seven felt that the topics were covered adequately and four did not think that they were. One school reported that in its opinion, the topics were probably covered adequately. In the fifty-four schools in which chemistry and physics are taught by members of the Arts and Sciences staff, thirty-nine reported that they did not think the topics were covered adequately for pharmacy students, six that they were, six reported probably, and three did not know.

Twenty-two respondents felt that there is an *undesirable* amount of repetition in some topics covered in the principles course while thirty-one did not. Seven schools did not know whether there was undesirable repetition, and five schools did not answer this question.

Twenty-seven schools reported that they felt that the principles course is an essential prerequisite for the succeeding pharmacy courses in the curriculum. Thirty-eight did not feel that it was essential, and one did not know. Of the thirty-eight schools who do not feel that the course is essential as a prerequisite, eighteen feel that it is a desirable prerequisite, fourteen that it is not desirable, and six either did not know or did not comment.

A question was asked about how the course could be changed to increase the effectiveness of the material generally offered in the course. Sixteen respondents would leave the course as it is at present, thirty-one would integrate it with the preparations course, nine with some other course such as dispensing or physical pharmacy (a total of forty-seven answers suggesting integration), eighteen would omit repetitious material, and three would eliminate the course entirely. In some instances, more than one suggestion was made, accounting for the seventy-seven total answers from the sixty-six schools.

Twenty-one schools reported that they felt that a course in physical pharmacy offered later in the curriculum would serve the interests of the student better than the course in principles offered early in the curriculum. Forty-one reported that they did not think this would be true. Four schools did not know or did not comment. It should be emphasized that the question was designed to determine whether the course in physical pharmacy could replace the principles course entirely, and in no way implies that any appreciable number of teachers are opposed to the inclusion of a course in physical pharmacy at a more advanced level. Twenty-one schools obviously favor the inclusion of physical pharmacy in the curriculum, and a number of the other teachers indicated approval

of such a course in addition to the principles course. Your committee did not feel that an evaluation or compilation of opinion in regard to physical pharmacy *per se* was within the scope of the committee's assignment.

One item of the questionnaire was designed to ascertain the intention of the various schools pertaining to the inclusion of the course in the impending five year programs. Ten schools reported that they will retain the course in its present form, eighteen will revise the course to a higher level, twenty-seven will integrate the material into physical pharmacy, while five schools report that they will drop the material entirely. Three schools either have not decided or failed to comment. Again, a number of schools reported more than one alternative accounting for the large number of answers.

Thirty-five schools report that, in the opinion of the teacher answering the questionnaire, the course should be retained in the five year program. Twenty-four report the opinion that it should not be retained. Seven schools reported intermediate grades of opinion concerning the desirability of retaining the course in the five year program.

An effort was made to determine the various titles which are used for this course. The titles are reported in the appendix. The respondents did not evidence any interest in standardizing titles for the course, and did not seem to feel that titles were particularly important.

A list of forty topics which are included in various topical outlines was submitted in the questionnaire to determine what is being taught in the courses in principles, and which were to be categorized as important for the five year program, repetitious of material in other basic courses, or which should be omitted from the course. Due to the length of the list and other possible reasons, the list was not completely checked by every respondent. With the exception of what is being presently covered, the other categories should be interpreted in a comparative way.

Your committee submits this report as a compilation of the information as submitted in the completed questionnaires from sixty-six of the seventy-six member schools of the AACP. The results indicate that a large number of schools still believe that a separate course in principles and processes is a valuable part of the pharmaceutical curriculum. It is equally evident that there is a strong movement toward integration of this theoretical area into other courses in the program, notably the course in preparations. While this movement originated some time ago, it has become more and



more evident in recent years, and may not have reached its peak at the present time.

Your committee does not feel that any specific recommendations should come from the committee, but prefers to present its findings for the study of the individual faculties in the hope that the information will be helpful in the disposition of this material in the various curricula.

The data submitted herein does not reflect the thinking of any members of the committee, except in those instances in which they participated in the filling out of the questionnaires for their own institutions.

(William R. Lloyd, Chairman; George E. Osborne, P. F. Belcastro, Orville H. Miller, M. L. Neuroth, Andrew Bartilucci, A. M. Mattocks, Leslie Ohmart.)

## APPENDIX

TABLE I

SURVEY OF TOPICS COVERED OR DESIRABLE IN PRINCIPLES AND PROCESSES COURSE

| Presently Covered in P & P Course |                | Desirable in Five Year Program |                |
|-----------------------------------|----------------|--------------------------------|----------------|
| Topic                             | No. of Schools | Topic                          | No. of Schools |
| Desiccation                       | 38             | Mechanical subdivision         | 44             |
| Evaporation                       | 37             | Filtration                     | 44             |
| Ignition and incineration         | 37             | Solution and solvents          | 43             |
| Sublimation                       | 37             | Extraction processes           | 43             |
| Filtration                        | 37             | Emulsification and emulsions   | 41             |
| Fusion                            | 36             | Storage and preservation       | 41             |
| Calcination                       | 36             | Metrology                      | 38             |
| Mechanical subdivision            | 36             | Density and specific gravity   | 38             |
| Refrigeration                     | 36             | Evaporation                    | 37             |
| Density and specific gravity      | 35             | Desiccation                    | 37             |
| Precipitation                     | 35             | Sublimation                    | 37             |
| Control of heat                   | 35             | Colloids                       | 36             |
| Metrology                         | 34             | Particle size differentiation  | 36             |
| Distillation                      | 34             | Precipitation                  | 35             |
| Solution and solvents             | 34             | Distillation                   | 34             |
| Crystallization                   | 34             | Viscosity                      | 33             |
| Generation of heat                | 33             | Surface tension                | 33             |
| Steam distillation                | 33             | Calcination                    | 33             |
| Storage and preservation          | 33             | Ignition and incineration      | 33             |
| Extraction processes              | 32             | Steam distillation             | 33             |
| Fractional distillation           | 30             | Crystallization                | 33             |
| Destructive distillation          | 30             | Sterilization                  | 31             |
| Carbonization                     | 30             | Fusion                         | 30             |
| Emulsification and emulsions      | 30             | Refrigeration                  | 30             |
| Reduced pressure distillation     | 28             | Fractional distillation        | 30             |
| Colloids                          | 26             | Control of heat                | 29             |

|  |    |  |    |
|--|----|--|----|
| Viscosity                                | 25 | Isotonicity                              | 29 |
| Surface tension                          | 25 | Reduced pressure distillation            | 28 |
| Sterilization                            | 24 | Ion exchange                             | 28 |
| Centrifugation                           | 23 | Centrifugation                           | 27 |
| pH                                       | 21 | Generation of heat                       | 26 |
| Isotonicity                              | 21 | Destructive distillation                 | 26 |
| Particle size differentiation            | 21 | Carbonization                            | 26 |
| Ionization                               | 19 | pH                                       | 25 |
| Ion exchange                             | 17 | Partition                                | 24 |
| Refraction                               | 16 | Ionization                               | 21 |
| Partition                                | 16 | Chromatography                           | 20 |
| Optical rotation                         | 13 | Refraction                               | 19 |
| Chromatography                           | 11 | Colorimetry and related analytical tools | 18 |
| Colorimetry and related analytical tools | 9  | Optical rotation                         | 14 |

TABLE II

SURVEYS OF TOPICS CONSIDERED REPETITIOUS OR  
POSSIBLY OMITABLE IN PRINCIPLES AND PROCESSES COURSE

| Repetitious                              |                | Omit from Course                         |                |
|--|----------------|--|----------------|
| Topic                                    | No. of Schools | Topic                                    | No. of Schools |
| Ionization                               | 38             | Optical rotation                         | 30             |
| pH                                       | 35             | Colorimetry and related analytical tools | 28             |
| Optical rotation                         | 30             | Refraction                               | 26             |
| Distillation                             | 29             | Chromatography                           | 26             |
| Fractional distillation                  | 29             | Ionization                               | 21             |
| Refraction                               | 28             | Centrifugation                           | 20             |
| Steam distillation                       | 27             | Generation of heat                       | 19             |
| Isotonicity                              | 27             | Partition                                | 19             |
| Precipitation                            | 27             | Ion exchange                             | 19             |
| Centrifugation                           | 27             | Surface tension                          | 18             |
| Colorimetry and related analytical tools | 26             | Destructive distillation                 | 17             |
| Sterilization                            | 26             | Control of heat                          | 16             |
| Density and specific gravity             | 25             | pH                                       | 16             |
| Reduced pressure distillation            | 25             | Sterilization                            | 16             |
| Chromatography                           | 25             | Crystallization                          | 16             |
| Viscosity                                | 24             | Viscosity                                | 15             |
| Partition                                | 24             | Particle size differentiation            | 15             |
| Generation of heat                       | 23             | Fusion                                   | 15             |
| Crystallization                          | 23             | Calcination                              | 14             |
| Surface tension                          | 22             | Refrigeration                            | 14             |
| Control of heat                          | 22             | Colloids                                 | 14             |
| Destructive distillation                 | 22             | Carbonization                            | 13             |
| Ion exchange                             | 22             | Ignition and incineration                | 13             |
| Fusion                                   | 20             | Fractional distillation                  | 13             |
| Filtration                               | 20             | Density and specific gravity             | 12             |
| Metrology                                | 19             | Reduced pressure distillation            | 12             |
| Ignition and incineration                | 18             | Precipitation                            | 12             |
| Solution and solvents                    | 17             | Distillation                             | 11             |

|                               |    |                             |    |
|-------------------------------|----|-----------------------------|----|
| Evaporation                   | 16 | Steam distillation          | 11 |
| Desiccation                   | 16 | Metrology                   | 10 |
| Refrigeration                 | 16 | Evaporation                 | 9  |
| Colloids                      | 16 | Desiccation                 | 8  |
| Particle size differentiation | 16 | Emulsification and emulsion | 7  |
| Carbonization                 | 15 | Filtration                  | 7  |
| Sublimation                   | 15 | Storage and preservation    | 7  |
| Emulsification and emulsions  | 14 | Sublimation                 | 6  |
| Calcination                   | 12 | Extraction processes        | 6  |
| Extraction processes          | 11 | Mechanical subdivision      | 6  |
| Storage and preservation      | 11 | Solution and solvents       | 5  |
| Mechanical subdivision        | 7  |                             |    |

TABLE III

COURSE TITLES IN USE

Basic Pharmacy and Pharmaceutical Calculations; Beginning Pharmacy; Fundamentals of Pharmacy, 2; Fundamental Principles of Pharmacy; Fundamental Principles and Practices; Fundamental Principles and Processes of Pharmacy, 3; Fundamental Principles and Techniques; Fundamental Processes; General Pharmacy, 2; Introduction to Pharmacy; Introductory Pharmacy, 5; Operative Pharmacy; Orientation, 2; Pharmaceutical Principles and Processes; Pharmaceutical Processes; Pharmacy Fundamentals; Principles of Pharmacy, 4; Theoretical Pharmacy, 2; Theory of Pharmacy, 2; Theory and Processes; Theory and Techniques.

TABLE IV

SUGGESTED TITLES

Fundamentals of Pharmacy; Fundamental Principles of Pharmacy, 1; Fundamental Principles and Processes, 2; Fundamental Principles and Techniques; Fundamental Processes; General Pharmacy, 4; Introduction to Pharmacy, 2; Introduction to Pharmacy and Pharmaceutical Techniques; Introduction to the Theory and Mathematics of Pharmacy; Introductory Pharmacy, 6; Introductory Physical Pharmacy; Introductory Principles and Processes; Pharmaceutical Physics, 2; Pharmaceutical Preparations; Pharmaceutical Principles and Processes; Pharmacy Fundamentals; Physical Pharmacy, 3; Principles of Pharmacy, 3; Principles and Practices of Pharmacy; Principles and Processes of Pharmacy, 8; Techniques in Pharmacy; Theoretical Pharmacy, 3; Theory of Pharmacy.

TABLE V  
LIST OF COREQUISITES AND PREREQUISITES FOR  
PRINCIPLES AND PROCESSES COURSE

| Corequisites             | Prerequisites              |
|--------------------------|----------------------------|
| Calculations             | Sophomore standing         |
| Physics                  | Orientation                |
| Inorganic chemistry      | Mathematics                |
| Organic chemistry        | General chemistry          |
| Biology                  | Calculations               |
| Pharmacognosy            | Physics                    |
| Physiology               | Organic chemistry          |
| Algebra and trigonometry | Biology                    |
|                          | History of pharmacy        |
|                          | Organic medicinal products |

TABLE VI  
CURRENT AND SUGGESTED DISTRIBUTION OF CREDIT HOURS FOR  
PRINCIPLES AND PROCESSES COURSE

*Lecture, Laboratory and Credit Hours as Presently Offered*

| No. of<br>Schools | Lecture<br>Hours | No. of<br>Schools | Lab.<br>Hours | No. of<br>Schools | Semester<br>Hours | No. of<br>Schools | Quar.<br>Hours |
|-------------------|------------------|-------------------|---------------|-------------------|-------------------|-------------------|----------------|
| 1                 | 1                | 11                | 0             | 6                 | 2                 | 4                 | 3              |
| 19                | 2                | 1                 | 1             | 13                | 3                 | 1                 | 4½             |
| 15                | 3                | 5                 | 2             | 10                | 4                 | 1                 | 5              |
| 4                 | 4                | 19                | 3             | 1                 | 5                 | 1                 | 7              |
|                   |                  | 2                 | 4             | 1                 | 6                 |                   |                |
|                   |                  | 1                 | 9             |                   |                   |                   |                |
| Average           | 2.55             |                   | 2.18          |                   | 3.2               |                   |                |
| Mean              | 2                |                   | 3             |                   | 3                 |                   |                |

TABLE VI CONTINUED

*Credit Hours Suggested*

| Semester Hours | No. Schools | Quarter Hours | No. Schools         |
|----------------|-------------|---------------|---------------------|
| 1              | 1           | 1             | 1                   |
| 2              | 6           | 3             | 1                   |
| 3              | 15          | 4             | 3                   |
| 4              | 8           | 6             | 1                   |
| 5              | 4           |               |                     |
| 6              | 2           | Average       | 3.34 semester hours |
| 8              | 1           | Mean          | 3.00 semester hours |
| 9              | 1           |               |                     |

*If pharmacy is to take its rightful place in the assembly of those who serve, it must be practiced as a profession according to its genus, its exponents must have a professional outlook and their training must be distinctive and definitive.*

H. Evert Kendig, Am. J. Pharm. Ed., 4, 332 (1940)

## THE PRESCRIPTION SURVEY AS AN AID IN TEACHING PHARMACY \*

DAVID D. STILES

Our prescription survey—the first continuous, national prescription survey—now operated through the cooperation of twenty-three colleges of pharmacy, came into being because of the service it could perform for these schools.

Six years ago, before I had embarked on this program, I conferred with several members of your organization who had had experience in operating local prescription surveys. These men were Dr. Stanley Mittelstaedt, Dr. John Boenigk, Dr. Henry Burlage, and Raymond Gosselin, who had conducted surveys in Texas, North Carolina, and Massachusetts, respectively. Despite the laborious task of collecting prescription information and analyzing it, without the aid of IBM machines, they found the information obtained sufficiently rewarding.

It therefore occurred to me that, if someone would underwrite the cost of collecting the prescription information and performing all of the statistical studies, the project would be worthwhile and acceptable to other schools. There would also be the additional advantage of combining the data from several cooperating schools to provide a national picture of prescription sales.

Thanks to the schools which have cooperated in this venture, the survey is operating efficiently, and we now study 200,000 to 300,000 prescriptions a year, making the results available to all colleges of pharmacy and to local, state, and national pharmaceutical organizations. Naturally, local area data are only available to the cooperating schools and local pharmacy groups, but our national statistics are available to all schools and pharmaceutical associations.

Probably the paramount function performed by the survey is to screen the multitude of products for which varying numbers of prescriptions are written, thereby enabling those who are teaching pharmacy to know the relative importance of these products from the standpoint of the frequency with which they are prescribed.

It may be of interest to you to know that, although 230,000 ingredients appeared in prescriptions written in 1955, only 241

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\* Presented to the Section of Teachers of Pharmacy, AACP, Detroit, Michigan, 1956.

official drugs and specialties were prescribed with a frequency of ten per 10,000 prescriptions or more. Strangely enough, during the six years we have been operating this survey, this figure has remained almost constant, not varying more than 3 or 4 per cent above or below this figure during any year. This has occurred despite the thousands of new drugs which have been introduced during this period and the tremendous increase in prescriptions written.

The number of specialties and official drugs prescribed, during 1955, at a rate of five per 10,000 or more is 400. Ninety-four of these were official drugs, and 304 were specialties. In these figures we have not counted separately different strengths or forms of the same product, if they were used by the same route of administration (orally, topically, etc.).

The problem of knowing what specialties to teach, if such a course is to be included in the curriculum, as you well know, is a difficult one. In our product index we list well over 5,000 different product names. These products have all appeared one or more times in our study of well over a million prescriptions in the past five years. Even this large number does not include many hundreds of other products which are promoted in very limited areas. These we try to trace and report in our local area reports, but their frequency is not sufficient to include in our national studies. About 1 to 1.5 per cent of trade names we are never able to locate in any of our reference books.

The problem is further complicated by the multiplicity of new products announced each year. Paul de Haen estimated the number of new products announced in 1955 as 403, of which thirty-one were new single chemicals. Jack Helenore of *Chain Store Age* reported 450 new products.

Such statistical information could only frustrate a teacher of pharmaceutical specialties unless he had some guide to determine which were currently prescribed with greatest frequency. No textbook could hope to keep up with this fast-moving procession of incoming and outgoing specialties. But a prescription survey can provide the answer. It can tell you what products are prescribed five or ten per 10,000 or more and thus provide you with a list of 230 to 400 products (official and specialties) that account for approximately 80 per cent of all prescriptions.

Another use to which many schools put this list of products is to develop a display of most frequently used products in their particular area, grouping the products by their therapeutic indications. Many schools feel that this stimulates interest in



their pharmaceutical display, which too often consists of hundreds, if not thousands, of bottles containing products which have a low prescription frequency.

Two other uses of such a display have been brought to my attention. In several schools, students are given prescriptions for these "high frequency products" on the back of which are listed questions which the students might be asked if interrogated about the drug in a state board examination. The student uses the display to read the label, examine the contents of the bottle, and answer many of the questions asked. Another use for the display which falls under the heading of "public relations" is to set up such a display as a school project at a local or state pharmaceutical convention. It is surprising how practicing pharmacists are attracted to such a display, and it conveys to them that the school has an accurate knowledge of just what is being currently prescribed.

In several of our pharmacy schools the teaching of pharmaceutical preparations is not limited to pharmacy students, but extended to medical students and student nurses. I am told that this list of most frequently prescribed products developed through the survey is of even greater importance in lecturing to these groups because of the limitation in time spent with them.

While this function of the survey, that of screening products according to their rate of frequency, is probably of greatest interest in this seminar, there are other functions which many regard as being comparable in their value as aids in teaching pharmacy.

Many schools feel that it is an excellent source of information on up-to-the-minute compounding problems. One of the cooperating schools has a file in which is placed a duplicate copy of all compounded prescriptions that students have copied since participating in our survey. While such extensive information on compounded prescriptions may not be necessary, it provides a chance to see what physicians are combining with the newer drugs and provides some interesting data in compatibility studies. Some feel the students' interest is intensified by the knowledge that many of the compounding problems studied come from prescriptions that are only days or months old.

In this connection, Dr. John Voigt's (1) recent paper presented before this group emphasized the value of the survey to the teacher of economics in pharmacy. He said the survey demonstrates the lack of information for the pharmacists to work with on many written prescriptions. He also cited a number of illustrations, taken from his prescription survey, with

vague or inadequate instructions for the pharmacist and the patient, which were used for classroom discussion.

A prescription survey provides you with a picture of the trends in compounding, which has shown considerable variation geographically, and you have the opportunity of comparing this trend in your local area with that of the national picture. You can also follow from year to year the percentage of prescriptions for specialties and for official drugs, which, by the way, may undergo some change this year since the adoption of the new USP and NF listings.

Variations in formulations have been interesting to observe over a period of years. These trends are not always constant. To illustrate, the trend toward the increased prescribing of tablets was temporarily halted by the wider use of oral anti-infectives in capsules, suspensions, elixirs, and timed medication; but, with many of these products, plus hematinics and nutritional products being made available in specially coated tablets, the trend is once again to tablet formulations.

Our prescription survey provides a study in language, that is, a count of prescriptions written entirely in Latin or English or a combination of both, studies in metrology, percentages of prescriptions for products of the fifteen or twenty leading companies, percentages of prescriptions written by physicians and members of other professions of the healing arts. Statistics are also supplied on the number of different products for a given area or nationally, and the number of prescriptions for competitive products for which no brand was specified, which runs surprisingly high, usually around 20 to 25 per cent of all ingredients.

Many schools are now including the study of prescription prices in their curriculum; our analysis of prescription prices by areas and nationally provides a great deal of valuable information for such studies. Not only do we show the average price from year to year, but we also show percentages of prescriptions at various price levels; and, in addition, we show from year to year the average prices of prescriptions making up the fourteen or fifteen leading therapeutic groups that account for about 85 per cent of all prescriptions. This study of therapeutic groups has additional information such as the percentage of prescriptions of each group to the total. As new important therapeutic markets, such as the corticoids and psycho-sedatives or ataraxics, develop, we add these to our analysis so that you can readily evaluate their importance.

The usefulness of a prescription survey was discussed three years ago at a meeting of your organization by L. E. Bingenheimer, Jr. (2), Assistant Professor of Pharmacy, St. Louis College of Pharmacy and Allied Sciences. To summarize his remarks, he said that it led to a separate course in pharmaceutical specialties; it increased students' understanding of problems and peculiarities of dispensing pharmacy; it developed an awareness of the relative importance of narcotic preparations, prescription compounding, prescription specialties and the more frequently prescribed dosage forms, and caused changes in the amount of lecture and laboratory time allotted to different types of preparations.

Hundreds of students who have participated in this survey since it started have received a close view of prescription writing which they say has been of considerable value to them, and probably this experience is even more important than the remuneration for copying the prescriptions, which we try to make as liberal as possible.

If there is any doubt in your minds about the benefits derived by the student who participates in a prescription survey, I suggest that you read the paper by Richard and Shirley Workman (3) which appeared in the January, 1956, *Practical Edition, Journal of the American Pharmaceutical Association*. They found the benefits numerous. Let me quote just a few excerpts from this paper:

Through the prescription survey we obtained a knowledge of the ingredients employed in prescriptions and their frequency in use . . . have gained invaluable experience in translating common abbreviations and symbols employed on prescriptions . . . gain an insight into diversified methods employed to price prescriptions . . . benefitted us through all levels of professional training . . . our vision of pharmacy has been enlarged.

I do not wish to use this time to publicize a paper which I am presenting at the Section of Economics of the American Pharmaceutical Association Convention on Thursday; but that paper, which is a chronological study of all products, official drugs and specialties, which appeared last year with a frequency of five per 10,000 prescriptions or more, would not be possible without this survey. And I am told that this study will be an aid to teaching pharmacy. I was amazed at some of the data which we developed through this study, such as the fact that 21.1 per cent of the official drugs were in the first USP published in 1820; and what amazed me even more than that fact was that the percentage of prescriptions for these drugs rather

closely paralleled that percentage of products. I am convinced that much more valuable data for teaching purposes can be developed from the survey and intend to investigate the possibilities for doing so.

Before closing this presentation, I would like to add a few thoughts on how the survey has been used by colleges of pharmacy to create better public relations with the practicing pharmacist. In many states the supervisors of the local survey have presented factual data from it in papers presented at their local and state meetings and for publication in their state journals.

Within the past month a member of your organization, who is participating in a very vigorous extension service program, told me that he felt the information obtained from the prescription survey in his area was the most useful aid to this work with practicing pharmacists.

Statistics on prescription pricing have been used in many ways to accomplish the same objective. In one area, based on pricing information from our survey, a booklet was prepared and sectional meetings were held throughout the state, creating much favorable comment and good will. In at least one instance the supervisor of the survey was appointed chairman of an important committee in his state pharmaceutical association because it recognized the importance of information which he was developing in the survey.

Just one other illustration I would like to mention, and that is of an unfortunate situation which developed in one area when a visiting physician denounced pharmacists for the high prices of prescriptions and talked about \$15.00 prescriptions as though they were very common and even mentioned that one patient had spent \$5,000.00 on antibiotics. The physician's talk and his figures were widely publicized by the press throughout the entire state. Now it so happens that prescriptions over \$10.00 for 1954 were only 0.6 per cent of all prescriptions, and the average prescription price in that state, at that time, was \$1.92. So the school, with our assistance, collected all this data and, in co-operation with their state pharmaceutical association, ran several articles in the same papers on the "low cost of prescriptions."

I realize that in the past few minutes I have digressed in mentioning some of the extracurricular uses of the survey. I felt that its varied uses, which supplement its primary function of screening products to determine the extent of their use, would be interesting.

A one-page outline of the various uses to which prescription surveys are put by colleges of pharmacy, as discussed in this paper, is available from the author.

It is also my hope that no one will construe anything I have said as a personal opinion about how pharmacy should be taught or how surveys should be used to teach pharmacy. I would not be so presumptuous. I have merely tried to pass on to you the ideas and thoughts of members of your organization, which I have gleaned from my discussions in your schools; and, since the first of the year, I have been privileged to visit forty-four colleges of pharmacy.

Several years ago Drs. Swinyard and Orr (4) collaborated on a paper entitled "The Value and Importance of Prescription Surveys to Colleges of Pharmacy." Commenting on the prescription survey they said,

Perhaps the most important applications which could be made are in formulating and modifying curricula and in planning course content. Curriculum design is governed by many factors which need not be enumerated here. The part played by a prescription analysis, however, should be one of indicating the relative emphasis which should be given the various disciplines.

They concluded their paper with this comment:

Finally it should be emphasized that colleges of pharmacy cannot resist the trends in retail pharmacy by ignoring the findings of prescription surveys. Such studies indicate where the emphasis must be placed in various pharmaceutical disciplines in order to train the pharmacist to the point where he can contribute intelligently and be of real practical service to the other health professions.

I hope that our prescription survey may continue to be of increasing help to you in attaining this worthy objective.

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## A LABORATORY APPROACH TO THE TEACHING OF PRESCRIPTION SPECIALTIES \*

M. G. WEBBER

The pharmacy students of the University of Houston are being taught prescriptions by a combination of lecture and laboratory methods. The program differs from methods used in other colleges in that, as a portion of the prescription practice laboratory work, emphasis is placed upon individual participation in a prescription survey and the use of a "prescription specialty card" to fill prescriptions in the laboratory.

During the past fifteen years, considerable interest has been shown in this area of teaching, but very little has been written on the use of laboratory methods. The Pharmacy Teachers' Seminar in 1955 postponed consideration of the subject since plans for this panel discussion had already been made. However, the dispensing section touched briefly on a few of the methods as reported by Netz (1). Several of those methods were as follows:

1. The use of discussion sections and examinations of various packages together with the manufacturer's literature and reference books.

2. The use and re-use of actual medication by dispensing from stock packages and later returning the item to the original container.

3. The use of clinics and dispensaries to give the student actual experience in dispensing prescriptions containing proprietaries. Each method has certain limitations and requirements which must be weighed in accordance with the needs of a particular institution. It may seem a fallacy to complicate the situation by suggesting a modification of these methods. However, the problems of limited space and unavailability of dispensing experience may be of sufficient need to make this approach of general interest.

In order to place the laboratory program in its proper perspective, it is necessary first to outline briefly the lecture approach to this topic. In the courses in pharmaceutical chemistry, pharmacognosy, and official products, specialty names are given as unofficial synonyms without emphasizing the name of the manufacturer. On the senior level in pharmacology, spe-

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\* Presented to the Section of Teachers of Pharmacy, AACP, Detroit, Michigan, 1956.



cialty names are stressed, but the greatest emphasis is given to prescription specialties in prescription practice. During the fall semester, registered-trademark names and their manufacturer's names are considered along with the study of dosage forms and advanced compounding techniques. These prescription specialties which have wide use as vehicles or are commonly compounded are discussed as to constituents and possible physical incompatibilities.

Chemical incompatibilities of the prescription specialties are considered with the appropriate chemical groups early in the second semester. During the latter portion of the semester, prescription specialties are discussed in detail. Here the therapeutic classification method is used with classification into subgroups being made on the basis of chemical structure. The subgroups are then divided into individual chemical compounds or mixtures. In this way, specialty names, dosage forms, and duplications can be presented as a unit along with names of the manufacturers and the usual dose of the product.

In support of the lecture program there is a two-phase laboratory approach which further emphasizes prescription specialties. The introductory phase of the laboratory work in this area consists of a prescription survey made by each student using punch cards as a means of recording the pertinent data. Methods of conducting prescription surveys and their evaluation have been reported by Bingenheimer (2), and Orr and Swinyard (3).

The student's reaction to prescription survey participation has been given by Richard and Shirley Workman (4), under the supervision of Mr. Stiles. However, at the risk of repetition, the writer feels that his program would not be complete without a brief mention of the use of the survey as an aid to the student.

The Texas Pharmacy Act has no provision which allows students to fill prescriptions intended for public consumption. The use of the student prescription survey, therefore, has been very helpful in stimulating the interest of the pharmacist in the student-employee and his training, as well as in allowing the student access to the prescription files, methods of pricing, and prescription stock arrangement. The use of currently written prescriptions in the physicians' handwriting is excellent training for the student. The process of learning specialty names by observation, rather than memorization, impresses the student with their importance much more emphatically than by any list of names supplied by the instructor.



The use of the punch card has several distinct advantages. First of all, it requires the student to code by number the use and name of each preparation. Thus the student reconsiders the information and consequently remembers the product longer. Second, the time saved by the instructor, in the simplified sorting and compilation process, is more than sufficient to justify the increased expense of the cards. A third item worthy of mention is the section concerning the legal status of the drug. In order that the student may become acquainted with this important fact, he must check and then notch one of the following categories for each specialty item:

1. Narcotic
  - a. Original prescription required
  - b. Telephoned prescription acceptable
  - c. Exempt preparation
2. Barbituate
3. Amphetamine
4. Legend preparation (other than given above)
5. Household remedy (across-the-counter item)

It is felt that by emphasizing the legal aspect of drugs as a part of the student's education he will be less apt to be guilty of indiscriminate refilling of prescriptions or illegal "across-the-counter" sales.

The final phase of the laboratory program is based upon the use of a collection of prescription specialties in condensed form. A full-size stock label of the specialty item and a sample of the product have been mounted on the front of a 5" x 7" piece of poster board. Dry medications are displayed in small plastic vials, and liquids or ointments are placed in screw-cap bottles. Reference literature, either in the form of a card, a product enclosure, or a catalog description, has been attached to the back of the card. Thus, each prescription specialty card contains, as a unit, all of the information generally requested, with the exception of the size and the appearance of the container.

In laboratory practice, the specialty cards are treated in the same manner as the stock containers in a prescription department which has its products arranged according to manufacturer. The student is given a prescription either by telephone or by copy. If he does not remember the manufacturer, several reference books are available for consultation. Once the manufacturer is known, the student proceeds to the proper file box. There he pulls the card for the specialty and takes it to his desk. The laboratory report form and requested information are completed as follows:

|                |   |
|----------------|---|
|                | 1. Manufacturer   |
| Rx             | 2. Active ingredient or ingredients<br>(by official, generic, or chemical name) |
| Specialty Name | 3. Appearance of the product  |
| Amount         | 4. Suggested use  |
| Sig:           | 5. Unit dose  |
|                | 6. Other forms available  |

The sample card is then returned to the file box and the prescription is considered filled.

At first, some of the more experienced students feel that reality is lacking. But when it is pointed out that the pouring or counting process as well as the typing of a label are largely mechanical operations, and that there are already too many pharmacists for whom these operations are the extent of their practice, the routine is accepted as another method of learning prescription specialties. The more popular a product is found to be, as determined by the prescription survey, the more often it is included in the laboratory work. By repetition, the student learns to recognize the appearance of the label and the product without actually being asked to memorize these facts. Those students who have had a limited amount of experience appear to enjoy this portion of the laboratory work and to profit greatly by the exercises in prescription specialties. Many of the students reared in a drugstore atmosphere begin to realize that, if a pharmacist is to earn a reputation as a pharmaceutical consultant, he must be able to tell the physician more than the fact that, "he has the preparation in stock."

New products and the accompanying literature are placed in a new-products display cabinet and are available for observation and study by the student until such time as they can be processed for filing.

The preparation, use, and filing of prescription specialties by the card system has certain disadvantages. Basically it must be recognized as a substitute for the use of stock packages; but, when display space is limited, the use of the cards can triple the number of specialty items available for study by the student.

The processing and filing of new specialties is time consuming, but it definitely aids the instructor by keeping him informed concerning the use and availability of new items.

Under the current system of attaching the sample to the card by a rubber band, there have been some samples displaced

by rough handling. However, this disadvantage is being corrected by replacing the rubber bands with copper wire.

In conclusion, it is believed that by exposing the student to specialty names throughout the last two years of his lecture attendance in all fields of pharmacy, and particularly in prescription practice, he will gradually accumulate a knowledge of this important branch of his professional training. The use of an individual prescription survey further broadens the student's knowledge of prescriptions, especially in the recognition of the names of the specialties which are widely used in his section of the country. Then, as a capstone, and of interest to those colleges which have limited prescription experience facilities for the students, the prescription specialty card provides information on a wide variety of products. This information is presented in such a way that the student upon graduation is familiar with the names of the widely used specialties, their appearance, and their use. It is hoped that the prescription report which the student prepares for each specialty studied will establish a pattern for the consideration of all new prescription specialties as they appear on the market. In this way, his education becomes a continuous process as well as an aid in earning him a position of professional respect.

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*The hope of pharmacy in America lies in this intangible and indefinable factor of ideals and idealism, and our schools of pharmacy must assume the responsibility of their inculcation in our students.*

Robert C. Wilson, *Am. J. Pharm. Ed.*, 1, 19 (1937)

## TEACHING PRESCRIPTION SPECIALTIES IN A CLINIC SETUP \*

W. E. McCONNELL

The need for the teaching of information relating to prescription specialties and trade-name products in the undergraduate pharmacy curriculum has long been recognized. The importance which we attach to this category of medicinal agents today is attested by the fact that this year's meeting of the Section of Teachers of Pharmacy is largely devoted to a symposium on this subject. Now we are interested in looking into some of the teaching methods which are being used to acquaint students with the so-called proprietary drugs.

Educational reference works on "teaching" and "learning" stress the point that those experiences which are most realistic—the actual life experiences—are longest and most vividly remembered. The length to which most dispensing teachers will go to simulate realistic conditions in the prescription laboratory is evidence of the educational value which they place, whether knowingly or not, upon "living experiences" or "reality." The compromises with reality which are made in the dispensing laboratory are generally those dictated by pedagogical expediency. Where facilities and circumstances permit placing the student in an authentic environment instead of in a simulated laboratory situation, it is generally assumed that much which is educationally worthwhile can be gained.

Several colleges of pharmacy make use of hospital or student health service pharmacy facilities for practical laboratory instruction in the dispensing course. Here the element of reality has a strong motivating influence on the student. The prescriptions and drugs which pass through his hands hold a special meaning for him. He has a more sincere and personal interest in them since he knows they are intended for actual patient consumption and are not simply to be graded and discarded.

If the clinic pharmacy happens to be typical of most of its kind, a large majority of the prescriptions which the student handles will be for specialty items. It is reasonable to believe that the student's contact with these drugs in such an environment may leave a more indelible impression on his mind than exposure to the same materials under conditions of simulated reality in the ordinary dispensing laboratory.

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\* Presented to the Section of Teachers of Pharmacy, AACP, Detroit, Michigan, 1956.

It is not my intention to debate the relative merits of the numerous and varied approaches to the teaching of proprietary drugs. Certainly this segment of information should not be left entirely to the dispensing course. I do not mean to suggest, either, that the dispensing laboratory cannot be used for the teaching of proprietaries. Obviously, in those colleges having no clinical facilities, the dispensing laboratory will probably be the only place where the student can be brought in contact with these materials. Even in those colleges where it is possible to provide practical clinical experience for students, such experience should augment and not replace other methods used for the teaching of proprietaries.

The assimilation of information about prescription specialties and trade-named products is only one of the objectives of the clinical laboratory portion of the dispensing course, and perhaps not the primary one at that. However, since this approach appears to offer some interesting and worthwhile possibilities for the teaching of a large and increasingly important body of knowledge, I would like to describe some of the salient features of such a program as conducted at the College of Pharmacy at the University of Michigan.

We are fortunate in having at the University of Michigan a large medical center which maintains an outstanding pharmacy department with extensive facilities. The hospitals making up the medical center include a main hospital and five ancillary hospitals plus a large outpatient clinic. The total bed capacity of the hospitals is over 1100. The medical staff is comprised of some 454 staff physicians, residents, and interns, representing twenty-four clinical specialties. An average of 900 patient visits per day are recorded in the outpatient clinics.

The pharmacy department is comprised of three main units: the outpatient (clinic) pharmacy, the inpatient dispensary, and the pharmacy laboratory. Senior dispensing students from the College of Pharmacy spend one three-hour laboratory period per week for two semesters at the hospital pharmacy as one half of the laboratory requirement for the course. During this time they rotate between the hospital pharmacy units, spending at least two consecutive periods in each location before moving to the next.

At the outpatient pharmacy, located in the clinic building, one student is assigned to the dispensing counter, and either one or two students to the adjacent compounding laboratory each afternoon. The 250 to 300 prescriptions which are filled at the

outpatient pharmacy each day are very similar to those which the average retail prescription store would process, with the vast majority consisting of specialty items. The student at the dispensing counter is allowed to do the actual filling of the prescription after the label has been typed. The procedure he follows is to read the prescription, check the label for mistakes, select the correct container, obtain the prescribed drug from its respective location, count or pour the correct amount of the drug, and affix the label or labels to the container. At this point he is required to check the prescription, the label, and the stock bottle again. If he feels everything is in order he places his initials on the prescription blank and sets the blank, the filled prescription, and the stock bottle to one side of the counter to be checked by one of the staff pharmacists.

Prescriptions requiring compounding which are received at the outpatient pharmacy are diverted to the compounding laboratory. Here, under the supervision of either a staff or intern pharmacist, the student is allowed to compound the prescription. Approximately 50 per cent of these prescriptions contain one or more proprietary ingredients. Most of them are proprietary dermatological preparations, oral antibiotic solutions and suspensions, and ophthalmic preparations.

One student is assigned to the inpatient dispensary each afternoon. This pharmacy unit, located in the main hospital, fills approximately 400-500 prescriptions daily, all of which are for hospital bed-patients. Here, under the supervision of one or more staff pharmacists, the student's activity is essentially the same as at the outpatient dispensing counter. In addition to most of the drugs handled at the outpatient pharmacy, the student sees many items which are seldom dispensed to clinic patients. These consist chiefly of the parenteral dose forms, diagnostic agents, and special treatment medications which are generally used only for hospitalized patients. Here, too, most of the prescriptions which the student handles are for specialty items.

Two students, supervised by one or more staff pharmacists, are assigned to the pharmacy laboratory where they are engaged in compounding operations closely paralleling those performed in the outpatient compounding laboratory. Prescriptions requiring compounding which are received at the inpatient dispensary are prepared in the pharmacy laboratory. The proportion of specialty items handled here is about the same as at the outpatient compounding laboratory.



At the dispensing counters the repeated filling of many prescriptions for the same items is in itself valuable in impressing on the student's mind outstanding features of these products. He learns to recognize the appearance of the product, the manufacturers' packaging, dose sizes available, usual dose sizes prescribed, special label notations, indications for use, and other features which are characteristic of the product. Each time a student fills or compounds a prescription for a specialty item with which he is not already familiar, he is required to look up information on the product in the references available in the dispensaries and laboratories. These references include the company catalogs, *Modern Drug Encyclopedia*, *Facts and Comparisons*, *U.S. Dispensatory*, and others.

After each laboratory period each student is required to submit at least two "Proprietary Product Information Sheets" describing items which he has handled during that day's laboratory period and for which he has not previously submitted such data. He is required to list for each product (1) the name of the product, (2) the manufacturer, (3) the generic name, if any, for the product or its chief active ingredient, (4) route of administration, (5) dosage form, (6) description of dose form, (7) ingredients and their quantities, (8) therapeutic action or use, (9) usual dose, (10) other available dosage forms, (11) contraindications or cautions for use, and (12) similar competitive products.

As inducement for the conscientious consideration of these specialty products, quizzes over a number of them are given periodically after the first six weeks of the first semester. Since it cannot be assumed that all students have studied all of the same drug items, each quiz is over ten products, and each student may answer the questions for any five of the ten included in the quiz. The questions generally relate to the manufacturer, action or use of the drug, chief ingredient, dose form, or other particularly outstanding features of the product. The quizzes are not difficult and are intended not so much as evaluating but rather as motivating devices. Many students become so engrossed in the routine of filling the prescriptions and somewhat hypnotized by the apparently overwhelming number of new things to be learned that they tend to overlook the fact that they may know nothing about the drug item itself—hence, the need for quizzes to remind them to pause occasionally to search for this information.

Besides written quizzes the students are subject to oral



quizzing by their supervisors any time during the laboratory period. If they do not know the answers they are required to consult one of the reference sources available. This applies to all students regardless of whether they are assigned to the compounding laboratory or the dispensing counter.

One great advantage of the clinical laboratory as regards the teaching of proprietary drugs is that this is practically the only place where students can gain much experience in the *compounding* of prescriptions containing proprietary ingredients. Because of the expense involved, such compounding in the ordinary practice dispensing laboratory usually is carried out only on a limited scale.

Of course the greatest over-all advantage of this method lies in the fact that the environment is *real*. The student has the opportunity of meeting the prescription "in context," so to speak. Just as words and sentences often lose their meanings and significance when taken out of context, so, too, do prescriptions. Thus, the prescription which the student is given to study and fill in the practice dispensing laboratory, even if it is an authentic prescription taken from the files of a retail store, can seldom be regarded in the same light as the prescription which is actually being filled for a patient waiting to take the medication.

Despite all the advantages which can be attributed to the use of the clinical laboratory as a teaching tool, it would not be advisable to give the student an entirely "free rein." Unless some written assignments are required, or unless the student knows he will be quizzed over some segment of information related to the laboratory work, he may have the feeling that he is being exploited as simply a source of "cheap help." On the other hand, too many assignments, written or otherwise, may tend to "dilute" the *reality* of the situation to the point that nothing is gained that could not be accomplished with less effort in the dispensing laboratory. When properly administered, with objectives clearly stated for the student, the use of a clinic setup for the teaching of proprietary products can be an effective teaching aid.

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## THE DRUGSTORE IN A PERIOD OF TRANSITION \*

MILTON P. MATTHEWS

Retail institutions are constantly changing as consumer demands make certain types of merchandising or operations outdated. In the field of retailing it becomes necessary for management to know when to change and when to "stand pat." When a new method of doing business is introduced, it is often difficult to know whether it is a fad or whether it will remain and become a permanent part of our system.

During the past one hundred years many new institutions have appeared, each bringing some better techniques for buying and selling goods. The department store, the mail-order house, the chain store, the supermarket, extensive branch operations, and the modern version of the discount house have appeared on the American scene. During this period the general store often died because it was not prepared to meet competition. It was not able to adjust in the new economy which came into being because of the automobile and good roads.

In the opinion of many, the drugstore operation is today in a period of transition. The operation of many drugstores has not changed radically in the past twenty-five years, a period during which food retailing has gone through a veritable revolution in methods, services, layout, location, display, sales promotion, and pricing. During this time the per cent of the consumer dollar going to the drugstore has decreased substantially. The *Census of Business* figures for 1939 and 1948 showed that the calculated dollar loss amounted to several hundred million dollars. This loss was due to a decreased share of the consumer dollar going to the drugstore. This is rather an indirect loss, and it is difficult to recognize in a period when drugstore sales have been increasing steadily each year. This increase in drugstore sales was really due to inflation, increased population, and a relative reduction in drugstore establishments.

These facts indicate that the drugstore group is losing ground when compared with retailing in general. The cause may be partly from without the drugstore and therefore beyond the power of the druggist to correct. On the other hand, it is quite certain that drugstores are falling behind some other types of stores in particular aspects, and, therefore, some of the blame must go to the druggist.

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\* Presented to the Section of Teachers of Pharmacy Administration, AACP, Detroit, Michigan, 1956.

The threat of greater competition from other retail and service institutions is real. Most of the items of merchandise carried by the typical drugstore can be purchased in other types of retail outlets. Many of these other retail outlets are selling merchandise with a lower gross margin and lower selling costs. It is true that there have not been widespread waves of price cutting for drugstore merchandise. Food markets have sold these items at list price. But if circumstances changed, especially in the status of resale price maintenance laws, food markets could sell these items for less and still make a profit. Most drugstores, using the present methods of operation, could not operate profitably with a reduced gross margin.

It is imperative that the retail drug industry take a second look at what is happening and do some soul-searching. I am not of the opinion that drugstores should become supermarkets, nor do I believe that the drugstore is doomed to fail if it does not adopt self-service and other practices of the larger food stores. Nevertheless, the drugstore could adapt to its own use many of the progressive ideas of competitors while at the same time capitalizing on its own present inherent strengths.

A study of consumer buying motives shows that consumer attitudes are in general favorable toward the drugstore, and customers have a sense of loyalty to the druggist. Despite generally favorable customer reactions, some frequent objections to drugstores are noted, and serious weaknesses in merchandising are apparent. In many instances improvements could be made, some of which are as follows:

1. The druggist should capitalize on his professional status to a greater extent because it is the one characteristic that sets him apart from competitors. Proper use of this position, granted by law, will provide a permanent advantage for the sale of all types of medications and related products.
2. The druggist should give more serious consideration to the opinions of the feminine customer because she is buying, or influencing the purchase of, most of the merchandise sold in drugstores. Better housekeeping, greater care in selecting merchandise offerings, and more attention to displays would be especially desirable in this respect.
3. Attempts should be made to increase multiple-item purchases. When about two customers out of three only buy one item, it is serious because it keeps the drugstore in the "high operation cost" category. This could spell future trouble if price competition with food markets ever comes. Increased multiple-item purchases could best be accomplished by better displays, self-selection (not self-service, but self-selection where the merchandise is displayed openly with salespeople ready to serve the customer). More suggestion selling would be a secondary means.

More multiple-item purchases in the drugstore would decrease impulse buying of drug merchandise in food stores after the individual neglected to buy it in a drugstore.

4. Certain departments, such as the fountain and prescription section, attract customers into the drugstore. Every effort should be made to sell these individuals on other departments within the store.
5. A careful analysis of merchandise selections should be made in an effort to eliminate many of the unprofitable lines handled, leaving the druggist free to concentrate on a narrower range of more profitable merchandise classifications. It might be noted at this point that most merchants take the opposite course of action and add more merchandise to supposedly increase sales and profits. Increasing sales is not always the best way to increase profits. Often more profit is possible through cutting down slow-moving lines!
6. A druggist should know customer opinions and take steps to strengthen any weaknesses that are present in his operation. Like the jilted suitor, the druggist may be the last to find out what people are saying about him. A few retailers have made beginning studies in the field of consumer research with excellent results for a modest cost.
7. Decisions relative to store location and store layout should be based on known characteristics of customer buying habits and attitudes. An analysis of per capita sales for drug merchandise will show how much volume can be expected in a given situation, for example, and other equally dependable factors can be studied.
8. Sales promotion should be planned carefully to take advantage of holidays and other peak sales periods.
9. More attention should be given to pricing, personnel policies, and customer services, in addition to the above-mentioned considerations.

It can be noted that most of the recommendations above can be divided into two categories: (1) Increased profitable sales, and (2) Decreased selling costs. Certainly the drugstore is now in a period of transition. On all sides we see other types of retail stores selling greater amounts of merchandise with lower operating costs. If the drugstore cannot compete successfully for tomorrow's consumer dollar it may be that many lines of merchandise will be lost and the scope of merchandise offerings will be reduced beyond a profitable point.

The long-range success of the retail drug industry will depend, to a considerable extent, on the present training pharmacists receive in colleges of pharmacy. In the Bible we note that the children of Israel were kept in the desert for forty years before being permitted to enter the promised land. Even Moses himself was not given this privilege. During these forty years the old generation, steeped in the customs of Egypt, died off. In a like manner the improve-

ments in the retail drug industry will come from the new generation. It is to be hoped that a five year program will give the opportunity to expand the area of pharmacy administration. The additional classes alone will not be sufficient! More qualified personnel must be sought and more local marketing research activity should be conducted. Today pharmacy administration departments obtain most of their data from trade associations, trade papers, and private firms. In a way this is a strange situation! This one-way street should be opened to traffic from both directions. Marketing research data should be also *coming from* colleges of pharmacy. The fact that this is not generally true indicates that pharmacy administration departments have not yet fulfilled their full measure of responsibility.

Certainly we are now in a period of transition. My general conclusion is that the drugstore has the potential for a highly successful business. Though it has in recent years lost some ground to competitors, there is no reason why it cannot compete successfully if it will capitalize on its inherent strength and at the same time adapt the progressive ideas of other retailers to its own use. Our task is to show the pharmacist of tomorrow how this should be done.

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*Pharmacy is definitely a service profession, and under present conditions renders a high type of service to more individuals of America than any other profession.*

Robert C. Wilson, *Am. J. Pharm. Ed.*, 1, 23 (1937)

## GROUP DYNAMICS TEACHES SALES PROMOTION \*

ROBERT V. EVANSON

The most desirable environment for the teaching-learning process is one which allows the teacher or student to suggest a principle, problem, or problem solution in such a manner that the points being offered can be questioned, discussed, and applied to the student's present or projected need. Whenever possible, it becomes the duty of the instructor to utilize usual or unusual methods to increase active participation during the class period within the controlled limits of the course content to stimulate personal thought and application.

An elective course in merchandising is offered to seniors. Content is based upon the sales-promotion functions of the drugstore. Because of a lack of adequate and sufficient text material in one volume to provide full assignments for each week, and because of a lack of student knowledge of journals in the area of pharmacy administration, an established program of library readings has been in effect for five years. The semester outline of course material is prepared in detail. Selected subject headings are chosen for each week to coordinate text assignments, lecture material, and library readings. Students are permitted to read any article in any journal so long as the article meets certain standards of quality and quantity as follows:

- 1) The article must pertain to the subject(s) listed for the week it is submitted or dated.
- 2) The article must pertain to, or in some way affect drugstore retailing and promotion.
- 3) The article must be equivalent to at least two full pages of the *Journal of the American Pharmaceutical Association* or the *NARD Journal* for a maximum grade.
- 4) The article must be reported in abstract on a 4 x 6 inch card properly titled, referenced, dated, and signed.
- 5) At least eight of the fourteen readings must be from different journals.

The majority of the students enjoyed the work. However, basic criticisms were indicated in that some students did not bother to apply the readings to personal experience or honest thought; authors

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\* Presented to the Conference of Teachers of Pharmacy Administration, Detroit, Michigan, 1956.

were considered to be idealists unfamiliar with the drugstore or its operation; and, in some instances, the readings were relegated to busy-work for the instructor or for a grade. These criticisms brought about a controlled experiment during the 1955-56 Fall term devised (1) to create student interest in sales promotion, (2) to expand the values from the established course requirement of weekly journal readings, (3) to provide an opportunity for group cooperation and individual public expression, and (4) to stimulate Saturday class attendance.

Reading assignments were established by subject headings for fourteen weeks. The class of fifty-four students was divided into ten groups of five to six students each. One student from each group was designated chairman pro tem. The members of each group received individually assigned articles upon which to base their contribution to the panel presentation. All such assignments were made one week prior to the date of presentation to insure uniformity of opportunity and current preparation. Each panelist was allotted five minutes for an uninterrupted review of the most important points stressed in his article. The chairman was permitted additional time to give a brief summary of the major points from all the articles. The remainder of the class period was opened to questions directed to the panel, personal comments from readings or experience, and general discussion under the direct supervision of the student chairman. The instructor joined the class in the back row and contributed in the same capacity as any other student in the audience.

The ten panel groups discussed the following subjects in the order given: The nature of competition, buying motives and habits, layout and self-service merchandising, promotional advertising, professional advertising, store front appeals, salesmanship and selling, sales training techniques, promoting the prescription department, and promoting the photo department. The latter was chosen at random from the various non-drug departments. The articles assigned for each panel were diversified as to authors and journals in order to inject a broadness of scope and variety of style. Sixteen of these were taken from non-pharmacy journals and forty-two were taken from pharmacy journals. (Four students were assigned two shorter articles which stressed the same points.) The student readings were satisfactory as a group and came from twenty-one pharmacy and twenty-six non-pharmacy sources of business and promotional information.

The general performance of the panels was satisfactory and indicated both preparation and forethought. However, some students required prompting on the time limit; others merely read from a



prepared paper with little expression and obvious dependency. It was also evident that some students were unable to ascertain the important points to stress; therefore they rambled and were uninteresting. Observations of the class performance as an audience indicated both attention to and interest in the panelists with some exceptions. The post-panel discussion periods usually suffered a momentary pause until the first question or comment was offered. This pause was reduced by audience-seeding techniques to stimulate prompt, directed questions on some specific points previously made by one or more of the panelists. There seemed to be about twenty students who carried the bulk of the discussion, and a minority of about fifteen students who did not make one comment.

After the semester was completed each student received a questionnaire designed to reveal personal attitudes and acceptance as well as to invite criticism. Only forty-four forms were returned for evaluation. The results were as follows:

#### Merchandising Panel Discussion Survey

1. In comparison to the regular lectures, did the panel discussions create more interest as a substitute for the third lecture?  
YES—31, NO—13.
2. Did the panel discussions present useful information?  
YES—42, NO— 2.
3. Did your participation on the panel improve your ability to organize and present your thoughts? YES—37, NO— 7.
4. Do you think the panel discussions highlighted the outside reading assignments and brought out the basic points?  
YES—38, NO— 6.
5. How frequently do you think such group discussions should be held?  
WEEKLY—28, BI-WEEKLY—12, TRI-WEEKLY—1,  
MONTHLY— 1, NOT AT ALL—1, NO ANSWER—1.
6. Did the automatic "A" on the reading assignment motivate you to put forth your best efforts? YES—11, NO—33.
7. What is your opinion of the calibre of the organization and presentation of the panel discussion?  
EXCELLENT—2, GOOD—23, AVERAGE—16 POOR—3.
8. In your opinion did the panel discussions serve: YES NO
 

|  |    |    |
|--|----|----|
| a. to provide training in group projects?              | 30 | 14 |
| b. to provide leadership training for chairman?        | 28 | 16 |
| c. to stimulate your class attendance on Saturday?     | 13 | 31 |
| d. as a source of boredom?                             | 13 | 31 |
| e. to stimulate your thinking on all subjects?         | 18 | 26 |
| f. to stimulate your thinking on some subjects?        | 37 | 7  |
| g. to stimulate your thinking on none of the subjects? | 2  | 42 |
9. Do you believe that the project would be more meaningful if the instructor were to serve as chairman for every group?  
(Please state the reason for your answer.) YES—13, NO—31.

10. Do you have any objections to the panel discussions as they were carried out?  
(If you answer yes, explain in detail.) YES—29, NO—15.
11. If you were to take this course over again, what suggestions would you offer to improve the learning and teaching value of (a) panel discussions, (b) instructor's lectures, (c) other?

According to the replies given, the experiment may be considered a success. There were only two students who failed to be stimulated into some thought and who stated that the panels did not present useful information. Each panelist received an "A" grade on his total assignment: however, the grade had little to do with the amount of effort expended for preparation and presentation. Approximately 75 per cent of the class indicated no special motivation by the panels to attend Saturday classes. This fact can be substantiated by an analysis of attendance records. The fifty-four students amassed a total of 121 absences in forty-five non-exam periods. Of these 121 cuts, fifty (41 per cent) were committed by six chronic cutters. There were thirty-four absences during the ten panel periods, and seventeen (50 per cent) of these were committed by the same six chronic cutters. It may be suggested that students attend classes according to their own convictions, and that special endeavors merely for attendance purposes have little effect upon group performance and response with respect to attendance.

A great deal of valuable information was received from the reasons and criticisms offered to substantiate answers for numbers nine, ten, and eleven. The majority of the class preferred student chairmen because "rotation permits variety," "the audience and panel are more relaxed," "students need the experience," and "it seems more like a class project without the instructor." The students who preferred the instructor as a common factor to all panels believed that he could better direct, control, and coordinate the points made and subsequent discussion.

There were nine specific objections stated ranging from subject matter to discussion periods. Fifteen students objected to the inability of their classmates to present a short, well-prepared discourse in an interesting and stimulating manner. Others thought that the chairman did not always control and direct the discussion into the proper channels as covered by the panel. Four students objected to the positive approach to a subject by coordinated articles. They preferred to use the pro-con approach to stimulate more interest.

Fifteen suggestions for improvement were offered. The most noteworthy of these was stated by eight students who believed that either the panels should feature more of a pro-con approach,

or that certain periods could be used to feature an informal debate by selected or volunteer students. Better preparation and organization were suggested by seven students who felt that the instructor could force better performance from the weaker students by providing complete details for abstracting, preparing and presenting the material so that everyone would know what to do and what was expected from them.

#### SUMMARY AND CONCLUSIONS

Group dynamics in the form of panel discussions is a desirable teaching tool in courses such as merchandising and management. Suggestions are offered here for teachers who contemplate the use of panels in some form as teaching aids in the classroom.

Course content and time schedules must be revised to consider lecture losses and panel gains. Panel content should be assigned so that it is properly integrated with lectures and text assignments. Panels of five or more students are not efficient for a normal class period because any necessary or unnecessary time extension detracts from the discussion period and tends to become boring. A three-member panel, with or without a moderator, would provide maximum time for presentation and discussion. However, to provide for equal opportunity, any class greater than thirty students should require two sections on panel days or should necessitate an adjustment in the size or number of the panels.

The desire to stimulate class attendance is not a valid reason for using special projects as teaching aids. The basic reasons for and objectives of such a class project should be the need for the instructor to formulate ways and means for the student to better utilize an existing course requirement in such a manner that the student becomes an integral part of his educational experience through thought development, public expression, and group cooperation. Such a project as described here demands that the student apply his professional background, his ability to read and think, the principles of public speaking, an appreciation of the rights and opinions of other persons, his ability to listen well, and his personal knowledge and experience in the formulation of a personal, workable philosophy of merchandising and management.

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## HIGHER EDUCATION AND PHARMACY ADMINISTRATION \*

JOSEPH H. KERN

The evolution of pharmacy administration in many respects has paralleled the growth and the development of the other phases of pharmaceutical education. A historical account of the development of this field reveals that its inception followed the development of the other phases, but the problems related to it were and are basically the same.

In the first edition of the *Pharmaceutical Syllabus*, in 1910, pharmacy administration had some form of recognition(1). The Blauch and Webster report of 1952 gave it individuality, and placed it on a plane with pharmacy, pharmaceutical chemistry, pharmacology, and pharmacognosy. Having emerged as an integral part of pharmaceutical education, its future now rests primarily with its teachers.

If the teachers of pharmacy administration enshroud themselves with a blanket of inert satisfaction, it is conceivable that the field might revert to a dormant state. Never in the history of education has there been a greater need for dynamic thinking and dynamic doing. This is especially true of pharmacy administration.

We, who have elected this field as our major interest and those who follow, must be dynamic thinkers and dynamic doers. It is the responsibility of all to make some contribution to pharmaceutical education that will aid in fulfilling the primary objective of our educational program.

*The Findings and Recommendations of the Pharmaceutical Survey*(2) has this to say about the objectives of pharmaceutical education and training:

The essential preliminary step in constructing a program of education and training is to state the aims and objectives to be attained, the goals to be achieved. These objectives need to be set forth clearly and in some detail in order to serve as a guide in outlining the program. For example, it is not enough to say the purpose of a course of study in pharmacy is to prepare pharmacists. One must know what are the duties and responsibilities of the pharmacist, in other words, what are his functions. One must also know what are the aims and ideals of the profession. And, lastly, one must know what kind of a person the pharmacist is to be. Agreement must be had concerning these matters, otherwise there can be no basis for understanding the types and quantity of education and training that are necessary to prepare pharmacists.

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\* Presented to the Section of Teachers of Pharmacy Administration, AACP, Detroit, Michigan, 1956.

In designing a program of professional education and training, *The Findings and Recommendations of the Pharmaceutical Survey* (3) set forth certain definite principles that should be kept in mind.

First, the subjects and subject matter should be selected, developed, and organized with the specific purpose of attaining the established objectives.

Second, the program should envision the opportunities and requirements of professional practice not as they exist currently, but as they probably will develop during the next two or three decades. Third, the subjects should be arranged in sound sequences, the earlier courses providing an adequate foundation for those that follow.

Fourth, sufficient time must be allowed for the student to achieve mastery of the subjects he studies.

Fifth, a program of professional education and training, while aimed at rather specific objectives, should nevertheless be sufficiently flexible to allow for at least some adaptation to individual students, and, Sixth, in the final analysis, the development and application of a curriculum in any college or school of pharmacy are prime responsibilities of the faculty, acting under the leadership of the dean.

Careful scrutiny of the above six principles seems to place the major responsibility on the teacher, or one might say that the first five principles are dependent on the sixth. Regardless of how we look at it, in the final analysis the development and application of pharmacy administration in any college or school of pharmacy is the prime responsibility of its own teachers.

In order to maintain and further the present status of pharmacy administration, there is a great need to strengthen our undergraduate program. There is still a greater need for newer, more up-to-date and more concise subject matter. In order for a teacher to make such contributions, he must have a sound background and show evidence of training and mastery in his field. Until the teachers of pharmacy administration give some evidence of these qualifications, the chances for this field attaining its rightful place in pharmaceutical education appear very small.

Preparation for teaching in colleges or schools of pharmacy is carried on in the graduate school. The qualitative phases of graduate work in pharmacy and allied fields are well defined in the Summer, 1955, edition of *The American Journal of Pharmaceutical Education* (4); the phases discussed are (1) institutional resources, (2) staff, (3) programs, (4) students, and (5) outcomes.

If we are to accept the challenge of placing pharmacy administration on a graduate level, we must be cognizant of the responsibilities that are associated with it. In order to discharge these responsibilities it seems that the best point of attack is the program. This is not to imply that the other phases of the graduate area are

any less important. The other phases mentioned above are important and are the basis of some of our difficulties. However, if the teachers can outline a program at the graduate level, it is possible that we will have overcome to some extent most of the problems associated with all the phases of this area.

A good program at the graduate level backed by sound comprehensive argumentation should be indicative of our foresight, our interest, and our ambitions. In turn, this should convince deans of colleges of pharmacy and deans of graduate schools that this type of program is not only essential to pharmaceutical education, but feasible.

In outlining and setting standards for higher education in pharmacy administration, one thought should be foremost in our thinking: the teacher of pharmacy administration must be a pharmacist. Therefore, the graduate student and prospective teacher should have at least a Bachelor of Science degree in pharmacy from an accredited college or school of pharmacy. In my opinion this is a prime prerequisite, and we should never lose sight of this fact. Preparation should embody courses in pharmacy administration as the major and courses in business administration as the minor or cognate. If the customary graduate program is followed, this will constitute approximately two thirds of the program, the remaining one third of the time being devoted to the thesis or dissertation.

It is not the intent of this paper to outline a specific graduate program or to say that definite courses should make up such a program. The problems associated with a graduate program are numerous and further compounded by the various standards and requirements of the different graduate schools. This we must recognize and take into consideration. Any attempt to set up a program is made more difficult when due consideration is given the type of student and the varying backgrounds of the students.

A list or outline of courses could serve as a guide to the major professor and the students' supervisory committee, and enable an individual student to work out a program that would give the type of background and training essential to the student's selected interest. If we are to assume that the major should be in pharmacy administration, the following list of courses could be of value in organizing a definite program for a particular student. The program should be flexible enough to permit the outlining of a program to suit the student's interest as a teacher of pharmacy administration or in the preparation for industry, hospital administration, or market research. These are a few fields where such a background would enable an individual to follow or select various fields of endeavor:

**Major—Pharmacy Administration**

|                            |                              |
|----------------------------|------------------------------|
| Retail pharmacy management | Drug marketing               |
| Drug wholesaling           | Retail drugstore analysis    |
| Retail drugstore problems  | Pharmacy law                 |
| Drugstore accounting       | Seminars in pharmacy         |
| Problems in pharmacy adm.  | administration               |
| Pharmaceutical industrial  | Hospital administration      |
| organization               | Education, pharmaceutical    |
| Retail pharmacy personnel  | Inventory control            |
|                            | Pharmaceutical merchandising |

The graduate student should be directed by a professor of pharmacy administration approved by the graduate school. A program composed of a major from the above list of graduate courses plus the thesis or dissertation should comprise two thirds of the required time.

The minor or cognate should be composed of courses selected from the following list:

**Minor or Cognate—Business Administration**

|                        |                         |
|------------------------|-------------------------|
| Economics              | Accounting              |
| Retailing              | Wholesaling             |
| Marketing              | Industrial organization |
| Retail personnel       | Business statistics     |
| Business risk analysis | Market research         |
| Business law           | Seminars                |
| Problems in retailing  | Management              |
| Managerial controls    | Credits and collections |
| Advertising            | Sales management        |
| Salesmanship           |                         |

This part of the program would constitute the remaining one third of the student's time. From the very nature of these courses it appears that the student will be required to take them in the school or college of business. In some institutions this may create a problem that may be overcome by virtue of having planned the program as outlined above.

If the two different groups of courses seem to be repetitious, it is probably due to the terminology. The courses comprising the major are or should be the application of the basic courses at the graduate level. The minor, serving as the basic fundamental material or supplementary to the major, should permit the student to better understand and apply his special interest.

There are undoubtedly other problems associated with the development of this area at the graduate level. However, agreement by the teachers of pharmacy administration, in the very near future, on a program that would be acceptable to the accrediting body for recommendation to schools and colleges of pharmacy will go far in eliminating some of our more perplexing problems.



A good graduate program should produce scholars and teachers who will assure pharmacy administration its rightful place in pharmaceutical education. With pharmacy, pharmacology, pharmaceutical chemistry, and pharmacognosy, it will fulfill the primary objective of our educational program, namely to prepare good pharmacists. The training of the pharmacist of tomorrow will be only as good as the teaching of today.

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- (1) Blauch, L. W., and G. L. Webster, *The Pharmaceutical Curriculum*, American Council on Education, 1952.
- (2) Elliott, E. C., "Findings and Recommendations of the Pharmaceutical Survey," American Council on Education, 1948, p. 39.
- (3) *Ibid.*, p. 41.
- (4) Green, M. W., *Am. J. Pharm. Ed.*, 19, 465 (1955).

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*The success of this Journal, like that of pharmaceutical education in general, will be measured by the interest we take in it, by the pride we feel in it, and by the vigor with which we support it.*

William G. Crockett, *Am. J. Pharm. Ed.*, 1, 125 (1937)

## THE STATUS OF PHARMACY ADMINISTRATION COURSES IN COLLEGES OF PHARMACY \*

HAROLD NELSON

### INTRODUCTION

Although it is an accepted fact that pharmacy administration has constituted an important part of the college of pharmacy curriculum for several years, information regarding the nature of courses, credits, and training of teachers in pharmacy administration has been decidedly meager. What courses should be offered in these subjects? What qualifications should be required for instructors in pharmacy administration? These are questions that confront the administrators and the members of curriculum committees. A great many of the colleges of pharmacy are not departmentalized formally.

This study has been made in an effort to determine the present status of pharmacy administration in the colleges of pharmacy in the United States. It is based upon the following aims: (1) To learn what courses are offered in pharmacy administration in the colleges of pharmacy, and what subject matter each course involves; (2) to determine the amount of credit given in each course offered; (3) to gain information concerning the qualifications of instructors in pharmacy administration; and (4) to determine the ratio of credit hours recommended in pharmacy administration courses to total credit hours required for graduation.

It is known that a considerable part of the retail pharmacist's time is spent in the management of his store rather than in the actual preparation of prescriptions. This phase of his work is truly a vital part of his business. The professional aspect, on which community and professional medicine is dependent, is his training and experience in the science of pharmacy, without which he would be a retailer rather than a professional man. He cannot, however, long maintain his establishment for the presentation of his professional services with training only in the science of pharmacy.

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\* Presented to the Section of Teachers of Pharmacy Administration, AACP, Detroit, Michigan, 1956.

The principles of administering business in recent years have become more complicated. Currently, there is such rapid growth in the instruction in business administration that many young men who plan to engage in business now pursue courses in this field to prepare themselves better for their work. In fact, so great are the financial risks involved and so difficult are many of the problems that have to be dealt with that only the unaware enter upon business beyond a small scale without first having acquired through careful study a thorough knowledge of business principles.

It is felt that a college of pharmacy cannot do justice to its students when it neglects training in pharmacy administration. It is not enough that students preparing to be retail pharmacists have good training in the art of pharmacy; the college has the additional obligation of providing them with the necessary training to practice their profession. They need to comprehend sound principles of business administration. This involves an understanding of the courses in business administration.

It is further recognized that the courses in the field of pharmacy administration should become a major part of the pharmacy curriculum.

Seventy-three colleges of pharmacy established in the United States offer training in pharmaceutical education. These colleges are accredited by the American Council on Pharmaceutical Education. A list of these institutions was secured from the Council.

Catalogs are the source of information regarding the status of pharmacy administration in the colleges of pharmacy.

In April, 1955, cards were sent to the deans of the seventy-three colleges. All of the colleges replied promptly by sending catalogs or letters explaining that a catalog would be sent as soon as it was off the press. By June 1, 1955, a catalog had been received from all except three of the colleges.

A list of teachers in pharmacy administration was secured from the secretary-treasurer of the Section of Teachers of Pharmacy Administration, the American Association of Colleges of Pharmacy. This list represents only those who are dues-paying members. A careful check was made of these members to determine whether they are actually teaching courses in pharmacy administration.

A further study was made of the academic titles as given in the catalogs from the seventy colleges.

CLASSIFICATION OF REPORTS AND FACTS PERTAINING  
TO ORGANIZATION

Few comments are needed regarding the geographical classification of the reports. As has already been indicated, catalogs were received from seventy of the seventy-three accredited colleges of pharmacy. These colleges are located in forty-three states and in Washington, D.C., distributed from New York to California and from North Dakota to Texas. New York has six colleges; Michigan, Ohio, and Pennsylvania have four each; Texas has three; Alabama, California, the District of Columbia, Georgia, Indiana, Iowa, Louisiana, Massachusetts, Missouri, Nebraska, Oklahoma, South Carolina, and Washington have two each. The remaining states have one each.

Seven of these colleges are independent private corporations not affiliated with a state or church-supported institution. Three colleges are state-supported, but are not a college or department of a state college or university. Geographically, the seventy-three colleges of pharmacy are divided into districts conforming to the district setup of the American Association of Colleges of Pharmacy.

Sixty of the colleges and universities are recognized by six different accrediting associations. Twenty-six of the institutions are recognized and accredited by the North Central Association; thirteen by the Southern Association; twelve by the Middle States Association; six by the Northwest Association; two by the Western College Association; one by the New England Association. Six of the institutions which operate only as a college of pharmacy are recognized and accredited by a professional association. One private college of pharmacy is recognized and accredited by a professional association. Three institutions are state-supported but recognized and accredited only by a professional association. Three of the universities having a college of pharmacy are not accredited by a regional accrediting association. Forty-two of the institutions are maintained by the state, and four are supported by a district or city. One of the nine denominational institutions is not recognized or accredited by a regional accrediting association. Nineteen institutions are classified as private.

Twenty-seven of the colleges sent catalogs containing announcement for the year 1954-55 and twenty-six for the year 1955-56.

Fifteen colleges publish biennial catalogs: eight for the period 1954-56, four for the period 1953-55, and three for the period 1955-57.

The enrollment figures are not included in the majority of the catalogs. This information was secured from the secretary of the American Association of Colleges of Pharmacy (1). Enrollments were found to range from sixty in the smallest college of pharmacy to 625 students in the largest college of pharmacy. Two colleges have enrollments of over 575, and fifty-three colleges have enrollments of less than 250. The eighteen remaining colleges have enrollments between 251 and 500. The average enrollment of the colleges, as found in this study, was 216.2, and the total was found to be 15,779.

In most of the seventy colleges of pharmacy the catalogs show a breakdown of the courses of instruction. Although a great number of the colleges are not formally departmentalized, some divide their courses of instruction in the following manner: pharmacy; physical sciences and mathematics; biological sciences; and pharmacy administration. A majority of the courses in pharmacy administration are listed in the various catalogs under pharmacy administration and pharmacy in the courses of instruction. Table I presents a list of the "depart-

TABLE I  
CATALOG LISTING OF PHARMACY ADMINISTRATION  
COURSES IN SEVENTY COLLEGES OF PHARMACY, 1954-55

| Department                           | Frequency | Per cent |
|--------------------------------------|-----------|----------|
| Pharmacy administration              | 143       | 41.4     |
| Pharmacy                             | 64        | 18.6     |
| Economics                            | 52        | 15.1     |
| Business administration              | 26        | 7.5      |
| Pharmaceutical administration        | 22        | 6.4      |
| Marketing                            | 8         | 2.3      |
| Accounting                           | 7         | 2.0      |
| Business organization & management   | 7         | 2.0      |
| Business education                   | 6         | 1.7      |
| Retailing                            | 4         | 1.2      |
| Division agriculture                 | 2         | .6       |
| Pharmacy and pharmacy administration | 2         | .6       |
| Social science                       | 2         | .6       |
| Total                                | 345       | 100.0    |

ments" under which are listed the various courses pertaining to pharmacy administration. In the institutions maintaining separate schools of business, the pharmacy administration courses are taught by instructors in business administration. In some instances the pharmacy administration courses are listed by both the college of pharmacy and the college or school of

business administration.

A study of the catalogs of the seventy colleges of pharmacy indicates that the number of courses offered in pharmacy administration ranges from one to eight. Twenty-three colleges, or 32.9 per cent, offer four courses. Eighteen colleges, or 25.8 per cent, offer five courses.

In further study within the scope of this survey, an examination of the catalogs was made in order to learn the number of semester hours recommended in the curriculum in pharmacy administration. Eighteen colleges recommend eleven to twelve semester hours while seventeen colleges include thirteen to fourteen semester hours.

Of the total semester hours required for graduation, 8.7 per cent represent semester hours in courses in pharmacy administration.

The *American Druggist* (2), in a recent survey of the deans of accredited pharmacy schools, found that the average pharmacy student in the United States spends 8.9 per cent of his classroom hours studying subjects in the field of business administration.

A study of the seventy catalogs to determine the number of elective semester hours provided for in the curriculum revealed that twenty-six colleges provide a range of zero elective hours to two semester hours. Some of the colleges provide for a greater number of electives, thereby making it possible for a pharmacy student to select courses in pharmacy administration.

#### SUBJECTS OFFERED IN PHARMACY ADMINISTRATION, DESCRIPTION OF COURSES, AND CREDIT OFFERED

A careful study of the catalogs of the seventy colleges of pharmacy in the United States disclosed the fact that eighty-eight courses pertaining to pharmacy administration are offered. Differences were discovered in the titles of the courses, but with the exception of one course in pharmaceutical economics no appreciable difference was noted in the descriptions. Pharmaceutical economics was used to describe the content of six different courses. The courses showing a similarity in content were broadly classified according to the suggested curriculum set forth in the pharmaceutical curriculum (3). Not all the courses were found offered in the "department" of pharmacy administration; hence, their relation to pharmacy administration had to be determined by the catalog description of each course. These eighty-eight courses represent all courses found in the catalogs which, according to their descriptions, consider pharmacy administration problems.

The number of courses dealing with pharmacy administration offered in the seventy colleges of pharmacy are listed in Table II. This table shows a wide range of frequency in the

TABLE II  
PHARMACY ADMINISTRATION COURSES OFFERED IN  
SEVENTY COLLEGES OF PHARMACY, 1954-55

| Courses   | Frequency | Per cent |
|---|-----------|----------|
| <b>ECONOMICS</b>                                  |           |          |
| Principles of economics                           | 54        | 77.1     |
| <b>ACCOUNTING</b>                                 |           |          |
| Principles of accounting                          | 34        | 48.6     |
| Pharmaceutical accounting                         | 8         | 11.4     |
| Drugstore accounting                              | 8         | 11.4     |
| <b>PHARMACY MANAGEMENT</b>                        |           |          |
| Drugstore management                              | 20        | 28.6     |
| Pharmacy management                               | 18        | 25.7     |
| Pharmacy administration<br>(drugstore management) | 6         | 8.6      |
| <b>PHARMACEUTICAL LAW</b>                         |           |          |
| Pharmaceutical jurisprudence                      | 21        | 30.0     |
| Pharmaceutical law                                | 16        | 22.9     |
| Jurisprudence                                     | 8         | 11.4     |
| <b>MARKETING</b>                                  |           |          |
| Drug marketing                                    | 10        | 14.3     |
| Principles of marketing                           | 10        | 14.3     |
| Marketing of drug products                        | 9         | 12.9     |
| <b>MISCELLANEOUS</b>                              |           |          |
| Business law                                      | 12        | 17.1     |
| Pharmaceutical economics                          | 6         | 8.6      |
| Principles of salesmanship                        | 5         | 7.1      |

number of colleges offering pharmacy administration courses. Principles of economics leads in popularity; it is offered by fifty-four of the seventy colleges. Principles of accounting is offered in thirty-four, or 48.6 per cent, of the seventy colleges. Drugstore management was found to be offered in twenty, or 28.6 per cent; while pharmacy management is offered in eighteen, or 25.7 per cent, of the seventy colleges. Principles of marketing and drug marketing are offered in ten colleges, or 14.3 per cent; and marketing of drug products in nine colleges, or 12.9 per cent. Pharmaceutical jurisprudence was found to be



offered in twenty-one colleges, or 30 per cent of all of the seventy colleges of pharmacy. Pharmaceutical law was reported as being offered in sixteen colleges, or 22.9 per cent of the colleges.

The courses are divided into five main headings as recommended in *The Pharmaceutical Curriculum* (4). The descriptions of the content of many courses in the various catalogs are almost identical. Therefore, one is led to believe that standardization of course titles is a much-needed change in the pharmacy administration of the colleges of pharmacy. It is noted from the table that a large number of courses are offered in only one college; these courses are grouped under a miscellaneous heading.

A careful study was made of the courses catalogued by the seventy colleges of pharmacy. The exact titles were listed, and a careful count showed that there are eighty-eight different course titles catalogued.

A summary of the pharmacy administration courses offered in the seventy colleges of pharmacy is shown in Table II. Although there were found to be eighty-eight different courses offered, only seventeen of these courses are offered in five or more of the schools.

Principles of economics ranks first with fifty-four, or 77.1 per cent, of the colleges offering a course under this title. Thirty-four, or 48.6 per cent, of the schools offer a course under the title principles of accounting. Third place is taken by pharmaceutical jurisprudence, with twenty-one, or 30 per cent, of the schools using this course title.

Drugstore management is offered in twenty, or 28.6 per cent; pharmacy management is offered in eighteen, or 25.7 per cent; pharmaceutical law is offered in sixteen, or 22.9 per cent; business law is offered in twelve, or 17.1 per cent, of the colleges. Principles of marketing and drug marketing are offered in ten, or 14.3 per cent, of the colleges.

The remaining eighty-one courses are offered in less than 14.3 per cent of the colleges. Of the total of eighty-eight different subjects offered, only five are offered in 25.7 per cent or more of the colleges, the remaining eighty-three subjects being offered in less than 17.1 per cent. Fifty-seven of the subjects are offered in only 1.5 per cent of the colleges.

Pharmaceutical economics is offered in six colleges. A study of the descriptions covering this subject in the various colleges showed that in each instance a different type of course is given.

It will be noted that the modal hours of credit offered in the majority of the subjects is three semester hours. Principles of

accounting has the greatest range, varying from  $1\frac{1}{3}$  to 6 semester hours of credit. Pharmacy management ranks second in range of semester hours of credit, namely, two to eight semester hours.

#### SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The problem of this study was to investigate the present status of pharmacy administration in the colleges of pharmacy. Specifically the writer wanted to ascertain the course titles and subject matter offered under those titles, the credit hours given for certain courses, the qualifications of those giving instruction in the courses, and the ratio of hours. Catalogs from seventy of the seventy-three colleges of pharmacy provided the data for the study.

Pharmacy administration has a definite and established place in the curriculums of colleges of pharmacy in the United States. This is evidenced by the fact that every college of this sort in the United States maintains instruction in pharmacy administration. There is, however, a lack of uniformity in the titles of courses offered in this field. The following conclusions are based upon the evidence presented in this paper and upon the catalogs described.

1. The seventy-three colleges of pharmacy are located in forty-three states and Washington, D.C.

2. Three universities with a college of pharmacy are not listed by national or regional accrediting associations.

3. Enrollments in the seventy-three colleges range from sixty students in the smallest college to 625 students in the largest college.

4. Eighty-eight different courses in pharmacy administration are offered in seventy colleges of pharmacy.

5. Two colleges of pharmacy are classified as B and three colleges of pharmacy are classified C by the American Council on Pharmaceutical Education.

6. The number of courses in pharmacy administration ranges from one to eight.

7. Eight and seven-tenths per cent of the total hours required for graduation from colleges of pharmacy is in pharmacy administration.

8. At the present time, no data are available to show who are teaching pharmacy administration; therefore their qualifications could not be ascertained. This fact may lead one to question the educational qualifications of those who are responsible for the instruction in pharmacy administration.

9. Eighty-eight courses pertaining to pharmacy administration are offered. There are differences in the titles of the courses, but no appreciable difference was noted in the description. The only exception was the title of the course in pharmaceutical economics which was used to describe the content of six different courses.

The primary purpose of the pharmaceutical curriculums today is to train the student not only as a professional man but also as a professional businessman. There is increasing emphasis on the professional side of pharmacy, but a recent survey of the retail drug business indicates that it is still predominantly dependent upon the successful merchandising of items related and unrelated to the prescription department (5). It is estimated that only 15 to 35 per cent of the total income and time consumed in the retail store is derived from pharmaceutical activities. Thus, it seems clear that specialized education for most graduates is not sufficient to meet the needs for a successful operation of a dynamic and prosperous retail drugstore, one capable of meeting present competition from other modern retail outlets. It thus becomes essential that the instruction in pharmacy administration include many of the subjects taught in business administration, such as economics, marketing, accounting, management, and pharmaceutical law. The writer of this paper recommends the following.

1. That the pharmacy students would be better served if the present wide range of subjects offered and the varying titles of courses were made more uniform.

2. That the "department" in which pharmacy administration courses are offered should be standardized by the college of pharmacy.

3. That a follow-up of the graduates of the colleges of pharmacy would be of value in determining how well the colleges have trained their students in pharmacy administration.

4. That, if the pharmacy administration courses are to receive the same recognition as other pharmaceutical courses, the defects now existing must be eliminated.

There is a need for further research in the field of pharmacy administration in the colleges of pharmacy, for instance:

- a more detailed and complete study of the educational qualifications of the teachers of pharmacy administration would be of especial interest and of real value;

- a study of the content of the pharmacy administration courses in the colleges of pharmacy would help prospective teachers; and

a report outlining required and elective subjects in pharmacy administration curricula would help administrators in planning the students' programs.

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- (3) Blauch, Lloyd E. and George L. Webster, "The Pharmaceutical Curriculum," American Council on Education, Washington, D.C., 1952, p. 169.
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*A college, or school, or university, without traditions of the highest order, has somewhere fallen short of its opportunities, and the cause, in whose interest it was supposed to function, would have progressed farther and on a much higher level had it never existed.*

Robert C. Wilson, *Am. J. Pharm. Ed.*, 1, 24 (1937)

## THE DEVELOPMENT OF A GRADUATE PROGRAM LEADING TO THE MASTER'S DEGREE IN PHARMACY ADMINISTRATION \*

S. B. JEFFRIES AND I. GREENBERG

Instruction in the field of pharmacy administration has, for the most part, been accepted as a fundamental part of the curriculum leading to a bachelor's degree in pharmacy. Broadly stated, the aim of the undergraduate pharmacy administration course of study (as recommended by the Committee on Curriculum of the AACP) is to provide the graduate with the kind and quality of training and terminal education needed to develop in him (1) a greater understanding of the economic and administrative principles related to retail pharmacy, and (2) a greater measure of competence in the practical applications of these principles to drugstore management and merchandising.

On principle, we have no serious quarrel with either the theoretical or practical sufficiency of the prescribed course of study in pharmacy administration—as terminal education—for the graduate who plans ultimately to make retail pharmacy his career. As a practical matter, however, we are a long way off from realizing the objectives of the program; and, until we can overcome the critical shortage of qualified pharmacy administration teachers at the undergraduate level, progress toward this end will be slow.

In this connection, it is worth noting that the Committee on Curriculum of the AACP suggests, in its report, that the colleges of pharmacy look to three fields for recruiting its staff in pharmacy administration, viz., pharmacy, business administration, and law, emphasizing that while a background in pharmacy is very useful, "adequate preparation in administration or law, or both, depending upon which the instructor teaches, *is absolutely essential.*" The report goes on to suggest that the individual planning to teach pharmacy administration or pharmaceutical law, and "whose basic training has been in pharmacy . . . *should prepare himself for it through adequate study of administration or law, preferably to the point of acquiring a degree in his field of instruction.*"

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\* Presented to the Section of Teachers of Pharmacy Administration, AACP, Detroit, Michigan, 1956.

On the record, our colleges have, obviously, not been singularly successful in either (1) recruiting enough qualified (i.e., with pharmaceutical background) pharmacy administration teachers from the business or legal fields, or (2) satisfactorily integrating the, more or less, standard types of business administration courses into the undergraduate pharmacy curriculum. And in addition to our somewhat questionable recruiting success in this area, we have ourselves failed to either (1) develop or stimulate real interest in teaching careers in this field among our undergraduates, or (2) plan and provide for the establishment of a sound and workable format for formal graduate work in pharmacy administration.

On the basis of this need for qualified teachers alone, there is ample justification for the establishment of a formal graduate pharmacy administration program. But the truth of the matter is that pharmacy's needs begin rather than end with the need for teachers. Our responsibilities run not only to retail pharmacy as such and the graduates who plan to make retail pharmacy their career, but also to those graduates who, in increasing numbers, are planning for careers in pharmaceutical fields other than teaching or retail pharmacy: industrial pharmacy, marketing and marketing research, management, sales, production control, personnel management, medical advertising, product promotion, journalism, purchasing, chain store management, wholesaling, institutional pharmacy, to mention but some of the career areas.

In view of these considerations, viz., the need for and the desirability of individuals trained both in the technical aspects of pharmacy and business, *we cannot urge strongly enough the establishment of graduate departments of pharmacy administration in colleges of pharmacy as the most suitable means of fulfilling these needs.*

The next logical step, at this point, would be a consideration of the basic problems that we would be confronted with, and would have to come to some agreement upon in the establishment of a graduate department. Among these would be: the objectives and requisites, scope, content, requirements for the degree, course descriptions, and a host of other matters. However, before plunging into these considerations, one very important matter must be resolved. Should the graduate program be limited to the master's degree or should it also include the doctorate?

It is our view, borne out by the record and in terms of achievement and experience, that few, if any, pharmacy administration departments, *per se*, are either ready or equipped to think of graduate education in pharmacy administration beyond the master's

level. To quote Prof. Evanson of Purdue University College of Pharmacy, "The department of pharmacy administration is literally an infant."

It is certainly more reasonable to develop thoroughly one level of graduate training in pharmacy administration before moving on to the next. And while it might inconvenience the student who is preparing for a teaching career, and to whom the doctorate is of prime importance, it is important for his sake as well as our own that any experimenting we have to do (and we will be experimenting for some time to come) be limited as much as possible to the first graduate level, rather than extended to both.

As a matter of fact, the student with ultimate Ph.D. aims for a career in teaching, can satisfy these aims by acquiring a doctorate in business administration at the university level subsequent to obtaining his master's in pharmacy administration. And as a practical matter, it should also be recognized that most of the students who enroll for graduate work in business administration look to the master's degree as terminal education. Discussion with directors of a number of leading business administration schools plus an analysis of student graduate-program objectives and degrees awarded point up rather sharply the fact that students preparing for careers or seeking training that will advance them in their already chosen careers in manufacturing, wholesaling, large-scale retailing, advertising, etc., do not as a general rule feel the need for, nor do they contemplate, graduate work beyond the master's level. There is no reason to believe that it would be otherwise in pharmacy administration.

In general, the fundamental objectives of the master's degree program in pharmacy administration should be to offer the pharmacy college graduate a degree equivalent in standing and value to a master's degree in business administration, providing him with a comprehensive knowledge of economic and business principles and the relationship of these economic and business principles to the problems of business and industrial procedures and practices in the pharmaceutical field, with major emphasis on broad general training rather than narrow specialization in commercial techniques as such.

In determining the basic requisites for a master's degree in pharmacy administration, we should consider carefully the relationship of the fundamental objectives stated above with the practical problem of the kind and quality of business and economic training and preparation given by our colleges of pharmacy on the undergraduate level.



A B.S. in Pharmacy should be a mandatory prerequisite for a master's degree in pharmacy administration, and should include a minimum of fifteen credits in pharmacy administration, comprising economics, drug marketing, accounting, retail management, and/or merchandising, and pharmaceutical law or ethics. It would be preferable to require at least one year of economics, that is, six credits covering economic principles and policies, but this would in most cases necessitate, at least for the present, an additional three-credit course prior to taking graduate instruction.

In this context of undergraduate requirements, the suggestion may be made that the requirements for the master's in pharmacy administration should equal or exceed those for the master's in business administration. Let us face the facts, however, and delineate our objectives in pharmacy's framework rather than in some other. Aware as we are of the fact that the undergraduate preparation for the master's in pharmacy administration is about 50 per cent less than that for the master's in business administration, can we, and should we try to match degrees point for point, or *should we recognize our specialized needs and develop a program that will meet those needs and be, at the same time, practically accessible to our graduates?* Certainly the value and standing of the master's in pharmacy administration will be adequately sustained, not only by the scope and content of course work and research required, but by the very uniqueness and directed nature of the program itself.

We must accept the fact that our master's program is being designed to meet the more or less unique needs of the pharmaceutical field, and that graduate business administration programs are not, for the most part, comparable either in scope, content, direction, or purpose—particularly purpose. We must also realize that we do not have a solid background of experience to go by, and that we are right now developing specifications as well as criteria, for a brand new area of graduate instruction. We will, to be sure, make mistakes, and, of course, we will be criticized. Comparisons will, undoubtedly, be drawn. We may even expect strong objections to be raised to such a program in quarters where this "independent" kind of thinking may be construed as striking at established programs in state and private universities. Speaking for ourselves, however, we shall be neither dismayed, disturbed, nor dissuaded from our objective of promulgating, what we feel will be, the best graduate program possible in pharmacy administration.

The proposed graduate course of study to meet the requirements for the master's in pharmacy administration (M.Ph.A.), comprising forty credit hours is as follows:

|  |        |         |
|--|--------|---------|
| <b>Major</b>   |        |         |
| 1. Business statistics & graphic representation      | 3 hrs. |         |
| 2. Economics and business policies                   | 4 "    |         |
| 3. Principles of management and administration       | 2 "    |         |
| 4. Marketing principles and practices                | 3 "    |         |
| 5. Fundamentals of accounting                        | 4 "    | 16 hrs. |
| <hr/>  |        |         |
| <b>Minor No. 1</b>                                   |        |         |
| 6. Advanced retail pharmacy management               | 4 hrs. |         |
| 7. Production control principles & practices         | 2 "    |         |
| 8. Elements of institutional pharmacy administration | 2 "    | 8 hrs.  |
| <hr/>  |        |         |
| <b>Minor No. 2</b>                                   |        |         |
| 9. Drug marketing, advertising and promotion         | 4 hrs. |         |
| 10. Pharmaceutical sales management                  | 2 "    |         |
| 11. Essentials of pharmaceutical salesmanship        | 2 "    | 8 hrs.  |
| <hr/>  |        |         |
| <b>Thesis</b>  |        |         |
| 12. Research seminar and thesis                      | 8 hrs. | 8 hrs.  |
| <hr/>  |        |         |
| Total  |        | 40 hrs. |

### Course Descriptions

1. *Business Statistics and Graphic Representation.* An introduction in applied statistics in economics. The development of the statistical method; classification and tabulation of data; graphic representation; averages, dispersion and skewness; time series analysis; measurement of secular trends; cyclical and seasonal variations; construction of index numbers and correlation. (Laboratory and didactic.)

2. *Economics and Business Policy.* (Prerequisite: a course in elementary economics.) Economic principles and policies as they relate to the structure and functioning of business enterprise, illustrating how the fundamental concepts of economics (i.e., economic science) can be used as a management tool in guiding as well as determining business policies. Discussion material should touch upon price, labor and investment, marketing, public relations, and similar matters.

3. *Principles of Management and Administration.* The management movement; organization and internal structure of business; principles of management and application to various departments of well-balanced enterprise; functions including: procurement, production, record-keeping, personnel and sales are developed from the problems of small business as well as large, heavy industry.

4. *Marketing Principles and Practices.* Survey of the field of marketing designed to give the graduate student an over-all view of the methods, policies, and institutions involved. The distribution of consumer goods, giving special attention to fundamental

marketing activities of manufacturers, wholesalers, and retailers, and their relationship to the total economy. Included are basic considerations such as: policy decisions on marketing research and product policies; trade channel policies; pricing policies and methods; sales policy determination; organization and methods; discount and allowance policies; and dealer and consumer contact policies.

5. *Fundamentals of Accounting.* An introductory graduate course designed to serve students who will be using accounting principles as managerial tools to assist them in analyzing and solving business problems. While prior accounting instruction would be helpful, it is not essential. The course deals with the basic principles of accounting that apply to service and mercantile businesses organized as sole proprietorships, partnerships, and corporations. Topics dealt with include: opening, maintaining, and closing books; preparation, analysis, interpretation, and use of financial statements; fundamental partnership problems (formation, dissolution, and distribution of profits); corporation and manufacturing accounting; fundamental problems of depreciation, depletion, and valuation.

6. *Advanced Retail Pharmacy Management.* An intensive study of store operations and their relationship to profitable retailing from the point of view of executive control. Emphasis placed on management operations of the large volume independent and chain stores. An analysis is made of trends and practices in store layout, maintenance and customer service, expense and capital budgeting and control, personnel management (selection, training, supervision, compensation, and welfare factors), and merchandising: purchasing, receiving, sales and promotion planning and retail advertising.

7. *Production Control Principles and Practices.* A non-technical course designed to familiarize the student with basic principles and practices of production planning and control as they apply to the manufacturing and wholesaling fields and to prescription production problems in the retail and institutional pharmacy fields. Discussions deal with sales and materials estimating, inventory of production capacities, fundamental materials control, routing, and scheduling of operations, job standardization and the development of production standards and costs; reasons for production controls in terms of increased customer satisfaction, more effective use of plant, total facilities and employees in all operational categories as a means of achieving maximum production and sales volume at lowest cost.

8. *Elements of Institutional Pharmacy Administration.* An introduction to the fundamental principles of institutional pharmacy administration and their application to key operational and functional managerial problems. Course material deals with: analysis

of the relationship of the pharmacy operation to the total institutional framework; physical plant and layout; personnel practices and policies; prescription manufacturing and production operations and policies; analysis of scope of executive duties, staff functions and institutional responsibilities of the institutional pharmacist, including: formulary and therapeutic committee activities, teaching, purchasing, storage, and distribution of drugs and chemicals, quality control, costing and pricing of medication, record-keeping and accounting.

9. *Drug Marketing, Advertising and Promotion.* An advanced and intensive course dealing with the formulation of marketing, advertising and promotional policies in the drug and cosmetic field. Analysis of organizational and product diversity trends and patterns. Use of market research as a management tool in product development and appraisal programs, production and sales planning. Marketing institutions, functional problems, techniques and trends involved in distribution of drug products through "ethical" and "trade" channels, "ethical" advertising and promotional practices and problems. Discussions will also cover: product policies, including packaging, identification, labeling and trademarks; pricing policies, competition, discounts, allowances, legal and other restrictions; promotional policies and practices, dealer helps and displays, premiums, contests and samples; policy decisions on distribution channels and market development; dealer relations, classification; distribution agreements and franchise policies; problems in financing marketing operations; governmental regulations of drug and cosmetic industry as to marketing and distribution, including: federal (FDA, FTC, Treasury Department, Department of Agriculture, etc.), state, and municipal regulations and regulatory agencies; distribution cost control policies and problems.

10. *Pharmaceutical Sales Management.* Organization of sales departments in integrated and non-integrated drug manufacturing and wholesaling establishments; line and functional types of organizations; sales planning, promotion and forecasting; techniques in selecting, equipping, and training medical representatives and other sales personnel; evaluation and use of psychological tests; determination of salesmen and dealer territories; salesmen and dealer quotas; compensation and sales production incentive methods; performance standards; selective selling; medical, research, and hospital liaison; trade and professional relations and liaison; evaluation, integration, and correlation of sales management activities with organizational advertising, promotion, legal, production, and product research policies and functions; analysis of sales, channels of distribution, and control of distribution costs.

11. *Essentials of Pharmaceutical Salesmanship.* Analysis of functions and responsibilities of the detail man or medical representative, in the distribution and marketing of drugs and pharmaceuticals, with emphasis on technical communications and liaison functions; technique of selling, including: technical product knowledge, developing professional contacts and over-all prospect evaluation; evaluation of customers' problems and needs; analysis and use of psychological buying motivations; developing, organizing, and presenting the sell story; handling objections; closing professional and "trade" contracts; development of salesman's personality.

12. *Research Seminar and Thesis.* Offered for the purpose of enabling the graduate student to undertake research under faculty guidance and required of all candidates for the degree. The report should embody the results of an independent and original study of some important problem in the student's major or minor field of interest. Guidance is provided in the selection of an appropriate topic, preparation of an outline, availability and use of research materials, and in the conduct of original research. In addition to a consideration of the formal methods of research in business, time will be given to a consideration of various problems of a typical nature by way of comprehensive case material.

There may, of course, be some questions raised with reference to the program *per se*, with individual courses chosen, their content, scope, and description, and the weight of the program, etc. That we expect, and that is as it should be. It might be interesting to note, however, that guidance and help in the selection of courses, the decisions on the weight of the program, and the determination of its objectives, scope, and content came, for the most part, from an informal advisory panel composed of outstanding leaders in pharmacy and business school education and in the pharmaceutical manufacturing, wholesaling, retailing (including chain store), advertising, and journalism fields. Parenthetically, there is nothing to preclude the eventual development of flexibility in the choice of minor groups of courses to achieve desirable pyramiding of the student's subject-area interests.

Finally there is the problem of getting the graduate program in pharmacy administration from the planning and drawing board phase to the classroom stage. This entails a multiplicity of administrative details and problems. Decisions must be made on such matters as the time limits of the master's program; the time of day the courses should be given, i.e., daylight, twilight, or evening. In New York City graduate courses in business administration are offered in the twilight and evening sessions because the greatest number of students and faculty find these hours most convenient. In fact, if we

are to look to the pharmaceutical field for students and faculty, and we will most certainly have to look to the pharmaceutical industry for faculty in order to *insure proper content orientation*, we will, for the most part, have to offer a twilight evening session graduate program.

Colleges of pharmacy with university affiliations including a business school will have to cope with course and program integration problems. There is likely to be a surprisingly large number of M.B.A. students who will select pharmaceutical courses as their major or minor field of interest. In fact, one local school of business administration, with no college of pharmacy affiliation, has already expressed keen interest in the possibility of setting up a graduate program leading to a master of business administration in pharmacy degree.

Naturally, this type of graduate program can be of tremendous value in building up industry-college of pharmacy liaison and developing richer, closer, and more purposeful relationships than ever before. Colleges contemplating graduate pharmacy administration programs should initiate the establishment of a permanent industry advisory committee on graduate instruction. Such a committee can help tremendously during the formative stage of the graduate program, making known industry's needs, pointing up career opportunities and employment channels, and, as a practical matter, assisting in the recruitment of students, as well as teaching personnel for the specialized courses, or parts thereof. A committee of this type proved to be of invaluable assistance to the City College School of Business (N.Y.) when it organized and conducted a comprehensive drug retailing and marketing extension program in 1950 and 1951.

In any event, administrative details and problems incidental to the development of a graduate program are certainly best left to be worked out by the individual colleges.

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*... pharmaceutical education as now offered consists not merely of the mastery of certain manipulative processes, but recognizes such training as a part of a broader program which includes sound education in the arts and sciences.*

William G. Crockett, *Am. J. Pharm. Ed.*, 1, 125 (1937)

## THE USE OF BREAK-EVEN GRAPH PROCEDURES IN PHARMACY ADMINISTRATION TEACHING \*

FLOYD A. GROLLE

A new concept in constructing a break-even graph enables one to obtain the conventional profit and loss break-even point in addition to a cash break-even point for a proposed level of operation.

Although mostly in the past the use of a break-even graph dealt primarily with forecasting procedures, its use as a means of revealing the effect of surpassing or failing to reach a budget goal is becoming increasingly more widespread.

A break-even graph may be constructed from data (1) of a projected profit and loss statement, or (2) of a recent profit and loss statement. In view of the peculiar function of a break-even, to reveal the consequence of missing a goal, a projected profit and loss statement would seem to be the best basis for constructing such a graph. Projected profit and loss statements rest upon the estimation of sales and each individual expense on the basis of various assumptions.

A reclassification of all expenses on the profit and loss statement must precede any attempt to construct a break-even graph. This reclassification is based upon the relationship of variations in expenses to possible variations in sales. Every business enterprise has some "fixed expenses." Their aggregate amount remains constant even though sales volume varies. Since some costs are *fixed* (dependent upon time and decision, not volume) the rest of the costs are less than the total, and surely less than the value of sales, which is *why* there is a *break-even point*. A break-even point does not manifest itself with the first unit sale because not all costs vary with units of sales, and, therefore, a profit cannot be realized until the costs which do not vary with sales are recovered. It is not an uncommon assumption among pharmacists that each dollar of sales registered represents to them a certain number of cents profit. Six to 7 per cent may be an apparent average drugstore profit rate but cannot be the rate on any particular sale as the profit and loss statement would indicate. This is a case where accounting procedures can be taken too literally.

The general terminology commonly used in determining the average break-even point is that costs are "fixed" and "variable."

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\* Presented to the Section of Teachers of Pharmacy Administration, AACP, Detroit, Michigan, 1956.



They are "fixed" because they do not readily vary with sales volume changes and "variable" because they do. Whether a particular cost is correctly assigned to one of these categories depends upon its natural relationship and the ability and willingness of management to control it as the rate of operating activity rises and falls. The use of the term "standby costs" is suggested as a more accurate term than the "fixed costs." The word "fixed" is inappropriate to explain the *time* concept of costs which vary with time but do not with volume. Because a cost may be temporarily fixed in futures of *time*, it is not fixed in the problems of managing. Thus, a cost of *time* which may be affecting a profit relationship can still be controlled by management. The function of control is simply changed to a time decision instead of a volume decision. Standby costs are those which because of style of operation, methods of selling, size of facilities, and stored-up knowledge of key individuals cannot be added or dropped at will through wide ranges of activity rate fluctuation.

In contrasting a break-even graph, it is desirable to subdivide standby expenses into (1) those involving cash expenditures in the budget year, and (2) those not involving such cash outlays. The third classification includes all expenses, the aggregate amount of which is likely to vary more or less proportionately to changes in the sales volume. These are obviously called variable costs which by their inherent nature and by the basic reason for spending the money should respond in this manner. Whether such response actually occurs depends upon adequate knowledge, visual controls, and forceful directions. They may be thought of as costs of *doing* business as opposed to standby costs, which are the costs of being *in* business. The fourth classification includes expenses which depend upon profit. Income tax is the most prominent example. Although not as common in the retail drug business, there are those expenses which are set by management policy such as dividends on preferred stock.

Below is given profit and loss data for a hypothetical business.

|                             |           |
|-----------------------------|-----------|
| Net sales                   | \$200,000 |
| Variable expenses           | 80,000    |
| Standby cash expenses       | 46,000    |
| Standby non-cash expenses   | 16,000    |
| Profit dependent expenses   | 30,000    |
| Managerial "fixed" expenses | 16,000    |
| Profit (retained earnings)  | 12,000    |

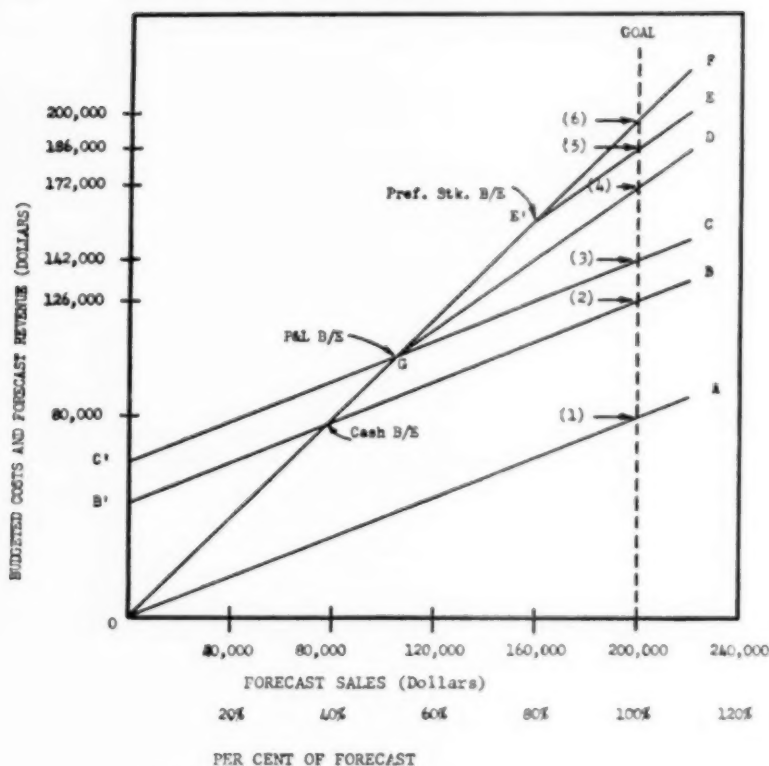


FIG. 1. TYPICAL BREAK-EVEN GRAPH

The horizontal axis (X-axis) of the graph in Figure 1 is plotted to designate the forecast sales for the period as well as per cent deviation from the forecast sum. Forecast sales=100% (See Figure 1). The vertical axis (Y-axis) signifies the dollar sum of the budgeted costs and forecast revenue. A perpendicular line is drawn at the forecast sales point which we will call the goal line. An arrow (1) is drawn on the goal line at \$80,000 representing the probable variable expenses. The next arrow (2) lies on the line \$46,000 above the variable expense level to record the standby cash expenses. Above this point the third arrow (3) indicates the area of standby non-cash expenses which total \$16,000. The area between arrows three and four shows the probable income tax liability. The region between arrows four and five marks the managerial "fixed" expenses. Above arrow four is shown the retained earnings of the forecast level of operations.

A line drawn through the \$200,000 level on the goal line to the intersection of the horizontal and vertical axes indicates the revenue expected at each stage of the operation (Line OF, Figure 1). In the same manner, a line drawn from the same intersection and through \$80,000 gives the variable expenses at each possible stage of operation (Line OA). A parallel line to OA and passing through the \$126,000 point on the goal line shows the sum of the standby cash expenses and variable expenses (Line B'B). Similarly, the line C'C gives the total of all standby as well as variable expenses.

The intersection of lines OF and B'B indicates the cash break-even point since at this scale of operations the revenue from sales is equal to the aggregate of the expenses that involve cash outlay. The point where OF and C'C intersect is the profit and loss break-even point, for here the revenue equals the total standby and variable expenses.

The vertical distance between line C'C and a line drawn from the profit and loss break-even point and through the \$172,000 on the goal line shows the probable tax liability for the achieved level of operations (Line GD).

If desirable the preferred stock dividend liability can be shown by a line E'E parallel to line GD but passing through the \$186,000 level on the goal line. The area above E'E represents the earning available to the holders of common stock at various levels.

A vertical line drawn at any point in the horizontal axis shows the probable magnitude of the various types of expenses at the particular scale of operations indicated. As the vertical shifts to the right or to the left of the goal line, two important facets manifest themselves. First, the direction of the expected changes and second the magnitude of the changes are suggested. I am sure that no one would propose that variable expenses would become zero if revenue were zero. The accuracy of a break-even graph diminishes at an increasing rate as the vertical, representing scale of output, shifts away from the point upon which the graph is based. However, the prediction reliability of a break-even graph is greatest in the area in which accuracy is most needed. The forecasting problem is seldom that of determining what will happen if sales are zero. In most cases the task is that of determining the probable consequences of exceeding or failing by a small amount to accomplish the budgeted sales volume. Within such a short range as that of

the projected sales volume, the accuracy of the chart is high enough to afford reliable forecasts.

The above example was given for illustrative purposes. Below are the actual budgeted figures (Table I) for a small drugstore with its constructed break-even graph (Figure 2).

TABLE I  
ANNUAL BUDGET FOR A DRUGSTORE

|                     | Per Cent<br>of Net<br>Sales | Dollar<br>Amount | Standby Costs |          | Variable |
|---------------------|-----------------------------|------------------|---------------|----------|----------|
|                     |                             |                  | Cash          | Non-Cash | Cash     |
| Net sales           | 100.0                       | 170,000          |               |          |          |
| Cost of goods sold  | 52.1                        | 88,500           |               |          | 88,500   |
| Gross margin        | 47.9                        | 81,500           |               |          |          |
| Managers salary     | 6.3                         | 10,700           | 9,000         |          | 1,700    |
| Employees' wages    | 20.0                        | 34,000           | 20,000        |          | 14,000   |
| Rent, heat, & light | 4.0                         | 6,800            | 5,100         |          | 1,700    |
| Advertising         | 1.6                         | 2,700            | 2,700         |          |          |
| Delivery            | 1.4                         | 2,400            | 1,000         |          | 1,400    |
| Depreciation        | 1.3                         | 2,200            |               | 2,200    |          |
| Taxes & licenses    | 0.8                         | 1,300            | 1,300         |          |          |
| Insurance           | 0.7                         | 1,200            | 1,200         |          |          |
| Telephone, etc.     | 0.5                         | 800              | 600           |          | 200      |
| Repairs             | 0.2                         | 400              | 400           |          |          |
| Miscellaneous       | 2.7                         | 4,600            | 600           |          | 4,000    |
| Profit before taxes | 7.4                         | 14,400           |               |          |          |
| Totals              |                             |                  | 41,900        | 2,200    | 111,500  |

The use of this procedure fits in quite well while discussing budgeting in our drugstore management classes. After the budget is prepared, a break-even graph visually points out the relationships between the components. It should be noted that the interests of various management persons are directed at different points. The treasurer is most concerned with the cash break-even point. The manager is apt to watch the profit and loss break-even point. By contrast, stockholders will be most interested in the preferred stock break-even point since their equity in earning begins at this point.

The described break-even graph should be compared with the conventional type used in many economics courses. The conventional break-even graph produces only one break-even point whereas the new concept makes it possible to obtain a cash break-even point as well as a profit and loss break-even point. In some instances a third (Preferred Stock) point can be illustrated.

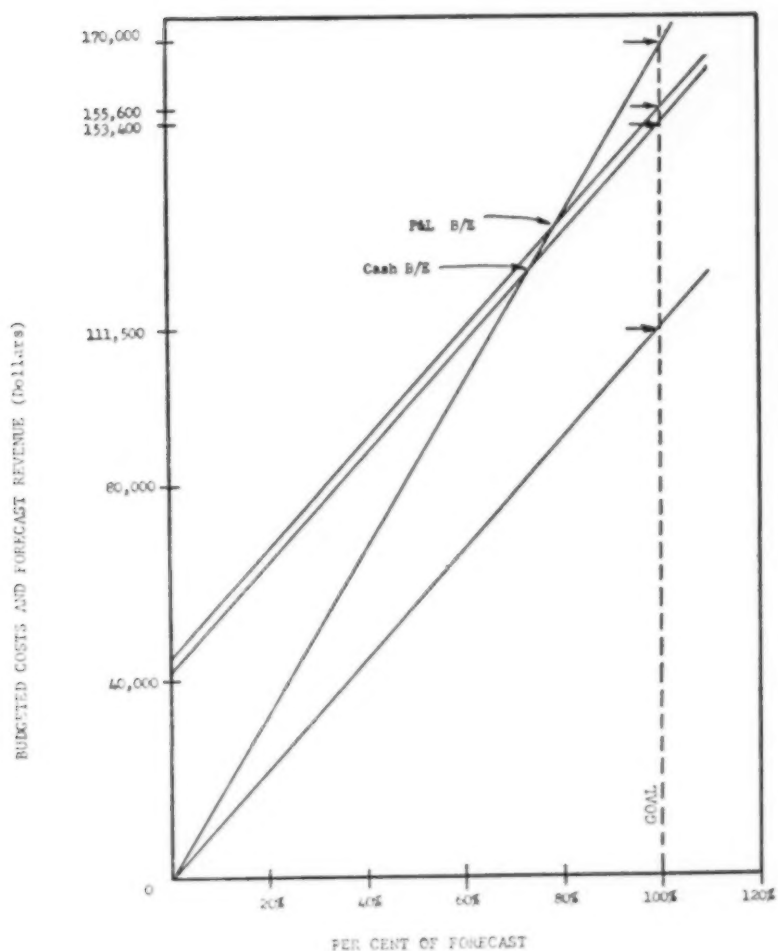


FIG. 2. BREAK-EVEN GRAPH FOR A SMALL DRUGSTORE

## REPORT OF THE DELEGATE TO THE A.PH.A.

Four resolutions of special interest to the AACP membership were passed by the House of Delegates. These were acted on later by the Council of the A.Ph.A. The comments made in this report are based both on the resolution and the council action as reported in Bulletin No. 7 issued from the A.Ph.A. office on May 29, 1956.

Under the heading "Education and Licensure" one of the resolutions passed was as follows:

*Resolved*, That a committee be created by the American Pharmaceutical Association to evaluate and publicize the ideals, aims, and purposes of the several programs of pharmaceutical education, and that such committee be fully representative of the practitioners of pharmacy so as to assure consideration of ways and means by which members of the profession may offer their cooperation and advice to those who are engaged in the development of standards for pharmaceutical education and licensure.

The council voted to interpret this resolution to include the preparation of a statement which will acquaint both members of the profession and prospective members with the aims and objectives of current revisions of curricula and programs embodying more extensive basic preparation for the education of pharmacists. The Council directed that this committee consist of five members of the Association to be appointed by the President of the Association, and that the committee work closely with the Council's Committee on Publication and with the A.Ph.A. representatives on the American Council on Pharmaceutical Education in the implementation of this resolution.

Your representative believes the intent of the resolution is satisfactory but is concerned with the action taken by the council. No mention is made of cooperation with the AACP. If the committee is composed entirely of retail pharmacists, as it could be according to the resolution, the AACP Executive Committee or some other responsible group of the colleges should be officially appointed as consultant. Probably the AACP will be consulted informally, but your delegate believes the action should be required by the Council. This matter will be presented by the delegate to the Executive Committee at its interim meeting.

Under the heading "A.Ph.A. Affairs," the following resolution was adopted:

*Resolved*, That the American Pharmaceutical Association study the advisability of holding district meetings in conjunction with the already established district meetings of the National Association of Boards of Pharmacy and the American Association of Colleges of Pharmacy.

The House of Delegates referred this resolution to the Committee on Local Branches for study and recommendation. The Secretary was directed to transmit the resolution to the Committee on Local Branches, and to explore the possibilities of this proposal with the affected groups.

Our Executive Committee will presumably decide whether or not such joint meetings should be held as far as the college groups are concerned.

Two other resolutions under the same heading were adopted by the House of Delegates as follows:

#### **Election of Officers**

*Resolved*, That neither the American Pharmaceutical Association nor its House of Delegates nor its Council shall adopt any change in the present procedure of election of officers which shall deny any active, dues-paid member an opportunity to cast his own individual secret ballot for the election of officers.

The House of Delegates approved the resolution with the recommendation that it be referred to the Special Committee to Study Nomination and Election Procedures. The Council voted to urge retention of the present system of electing officers by mail ballot and directed the Secretary to publicize the resolution and refer it to the Committee on Study of Nomination and Election Procedures.

This resolution was the answer to a suggestion made to have the A.Ph.A. officers elected at the convention by members of the House of Delegates. There was considerable discussion on the floor concerning this suggestion. Nearly all of it was against such a change.

It is interesting to note that the council opinion was the same as that of the AACP. Our group, it may be recalled, voted to oppose any change in the election procedure which would do away with individual mail ballots for each A.Ph.A. member.

#### **Time of Convention**

*Resolved*, That the resolution offered by the Council on Conference of Teachers to request the American Pharmaceutical Association to study the possibility of changing the date of the annual meeting of the A.Ph.A. and affiliated organizations to a time outside of the academic year be referred to the Council of the A.Ph.A.

The House of Delegates adopted the resolution. The Council voted that no further action could be taken on the time of holding the annual meetings at this juncture because the membership has voted by a mail ballot to hold the annual conventions in the spring; however, the resolution was referred to the Committee on Place of Meeting for further consideration.



The council action could not have been otherwise in view of the vote of the A.Ph.A. membership to hold spring meetings. The Executive Committee of the AACP is keenly aware of the desire of the college representatives to meet at a time other than during the academic year. This problem was the first item of business, after adoption of the budget, at the post-session meeting of the Executive Committee. The committee is also aware of the desire of the membership to hold the AACP meeting at the same time as the A.Ph.A. Under present conditions these two wishes of the membership are completely in conflict. The Executive Committee voted, therefore, "to meet at the same place and coincident with the annual meeting of the A.Ph.A. for 1957-60."

Dean Troy C. Daniels, University of California, was elected chairman of the House of Delegates for 1956-57. This marks the first time in ten years that a college representative has held this position. The late Dean Hugh C. Muldoon of Duquesne, chairman for 1946-47, was the last educator to serve in this capacity.

Tom D. Rowe, Delegate

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*We must help those under our charge to become socially mature and responsive to the political and economic, as well as the professional and scientific changes of the times. This is especially important in these days of growing racial, religious, and political tensions.*

Hugh C. Muldoon, *Am. J. Pharm. Ed.*, 2, 476 (1937)

# PRESIDENT'S SECTION

## OUR FIFTY-SIXTH YEAR

For some scientific organizations fifty-six years might be considered a short existence. Call this a young organization if you wish, for it is one possessing vigor and a real promise for future growth, but recognize also the indications of its age in a rich history of achievement.

Throughout its existence its strength has been due to the active cooperation of its officers and members. Such leaders were our first four Presidents—Albert A. Prescott, Joseph P. Remington, Edward Kremers, and Henry K. Rusby—whose vision and lives of dedicated service to pharmacy assured us success at the beginning. To read the list of past officers of this Association is to read the "Who's Who in Pharmacy." Throughout the past years we have been fortunate in our Presidents. Let us pay grateful tribute to H. Evert Kendig, Hugh C. Muldoon, and Bernard V. Christensen. They are no longer with us, but pharmacy is richer because of their many contributions to our profession.

The fall is here, and we are just past the strenuous days of the opening of the new school year. Regardless of how many years we have been teaching, there is a thrill in each new opening session. New students, new staff members, and new problems all bring gratification and challenge: a sense of satisfaction in reflecting on any success in the past year, a challenge in striving for a better year ahead. Certainly no one truly interested in his profession can ever feel entirely satisfied with his past accomplishments, and he will never cease striving to attain the perfection he hopes for in the future.

This fall finds new faces as the deans of our Association Colleges and Schools of Pharmacy—Curtis H. Waldon at the University of Colorado, Lloyd Parks at Ohio State University, Jack E. Orr at the University of Washington, Andrew J. Bartilucci at St. John's University, Arthur G. Zupko at Brooklyn College of Pharmacy, Robert L. VanHorne at Montana State University, Warren I. Weaver at Medical College of Virginia, and Heber Youngken, Jr., at the University of Rhode Island College

of Pharmacy. To each of these men go our best wishes for a progressive, forward-looking, and vigorous administration, accompanied by their health to make this possible.

To every new staff member, and there are many, we wish an enjoyable experience in the thrilling and satisfying profession of teaching. May you develop the skills and abilities to stimulate in your students the appreciation of the high heritage of our profession; to create in them the ethics and desire to serve the community well and to encourage their participation in extra-curricular activities in college; to advise their wise election of courses for the development of an interest in living, as well as in making a living; and above all to urge them to be good citizens in their profession, in their community, and in their country. Such opportunities are open to relatively few, the preachers and the teachers, make the most of them.

#### RECRUITMENT AID FILMS

The Committee on Recruitment Aids is to be congratulated on seeing to a successful conclusion the release of the new films *Time for Tomorrow* and *Design for Life*. Every college should use these films in carrying to our high schools and to other vocational guidance programs the message about our important health profession. Certainly we should be satisfied with nothing but the best of the high school graduates. With this quality of high school graduates and a realistic program of training, we should be able to meet satisfactorily the demands upon our schools for personnel to engage in research, teaching, hospital pharmacy, and industry, as well as in retail pharmacy.

It is my hope that each of our schools or colleges has been in contact with the teachers who attended the Fifth Annual Industrial Council program held at Rensselaer Polytechnic Institute last October. You will be surprised how anxious these teachers are for more literature about our profession, how pleased they are to receive your offer to speak to their students in the science groups or at their Career Day programs, and how anxious they are to have these films for their own guidance work.

Not only should we encourage the use of these films in high schools and before civic clubs, but we should remember that they are available in black and white for television use. For information about these films and for purchase of your own copies of the color films, address your orders and communications to Dr. George L. Webster, Secretary-Treasurer of the AACP, University of Illinois, Chicago, Illinois.

## COMMITTEE APPOINTMENTS

In the last issue of *The American Journal of Pharmaceutical Education*, Summer, 1956, page 441, the Association committee appointments were announced. It is always a great satisfaction to find that year in and year out the cooperation of our members and the quality of their efforts remain high. This year is no exception, and, as in the case of my predecessors, I am pleased at the ready acceptance of appointments for the year 1956-1957. The issues that lie ahead become more and more involved as our Association faces the future of professional training.

I realize that it is always a danger to list names or projects in such an active group as ours, for there may be an omission or two of names or objectives. I shall venture, however, to mention a few of the important studies under way. Dr. R. Lyman and his fine group have accepted the challenge of studying the likely changes which will take place in the practice of pharmacy within the next decade or so. Dean L. David Hiner and his committee of two have the responsibility of carrying on the excellent manpower study initiated by Dr. George L. Webster. The Committee on Hospital Pharmacy Education is studying and developing courses to be given at the undergraduate and graduate levels, and is considering other problems concerned with education in hospital pharmacy. We expect a realistic report from this committee under the chairmanship of Dean Tom D. Rowe. The excellence of the work on recruitment aids under Dr. Richard Deno is well known to us all. The committee has added plans to carry this program into high schools by direct contact with vocational guidance teachers. The third edition of *Shall I Study Pharmacy*, under the direction of Dr. Donald C. Brodie, is under way, and it is hoped that it will be available for use by September of 1957, if not sooner.

The problem which looms larger every day is need for a frontal attack on predictive tests. Though this is a problem which has been studied a number of times in past years, it needs further consideration. We need a considerable grant to enable us to employ experts in developing such a test. Use of such a really satisfactory test by our members on a nationwide basis would do much to raise the standards of our profession. This program should be an accessory to and run parallel with our recruitment program. It is my belief that the answer to this problem would be one of the most valuable contributions to our Association. Dean Joseph B. Sprowls and his committee are in a fine position to bring us such an answer. One of the long-

range problems facing our Association is the development and improvement of our graduate programs. Such problems are in good hands with Dr. John E. Christian and his associates, who are facing up to the involved effects of the five and six year programs on graduate study, among other problems.

I hear regularly from Dr. George Osborne on the work of his Committee on Pharmacy College Libraries, Dr. Glen J. Sperandio on the Committee on Educational and Membership Standards, Dr. Heber Youngken, Jr., and his group on audio-visual aids. No doubt many other committees are working hard, but their progress has not required correspondence with me so I am not able to report on their success. They will all have a constructive and progressive report for us at the New York City meeting next April.

#### TEACHER SHORTAGE

We are all well aware of the press of numbers that lies ahead of us in the not too distant future. Some plans are under way for plant expansion, better space utilization in laboratory teaching, and bigger budgets. I am fearful that we may, and hopeful that we will not fall prey to the easy way out of diluting the quality of our training with poorly trained teachers. We must find ways not only to maintain high standards of instruction, but also to raise them to meet the more complex demands upon us as public health servants.

As I view the positions accepted by recent M.S. and Ph.D. trainees, I am alarmed at the great numbers entering industry and the few entering teaching. Their choice may be understandable, but the situation still is frightening. Without inspirational and excellent teaching, our product will not be of the standard needed to protect the health of our citizens. It is the responsibility of our pharmacy administrators to find answers for depressed levels of faculty salaries, and to work out cooperative plans with industry toward the end of more summer employment for the younger teacher group and more consulting for those who have been on our staffs for a longer time. These aids not only increase their annual income, but, more important, they give valuable experience which will result in better teaching. It is not difficult for me to see that really effective teaching can come only from the proper blending of theory and practice. Every aid industry gives us in training our undergraduates or graduates returns to them one hundredfold.

Certainly summer work in a retail store cannot fail to im-

prove the teaching of dispensing, as laboratory work in pharmaceutical manufacturing will help bring benefits to those engaged in presenting courses in manufacturing pharmacy, product formulations, and instrument analysis. So, too, hospital pharmacy teachers can best teach this subject only after contact with pharmacy in hospitals.

In no way do I overlook the vast help now received from industry by our schools and colleges through the American Foundation for Pharmaceutical Education and in many other direct ways. I am concerned only that the flow of trainees is not too great in their direction, for to deprive the colleges of excellent teaching material will be, in the long run, industry's loss. That which helps them helps us, and vice versa.

#### PHARMACY ADMINISTRATION SEMINAR

It was my privilege and pleasure to attend the Eighth Annual Teachers' Seminar held in Austin, Texas, during August of '56. This year the Seminar was devoted to the subject of pharmacy administration. The program was well conceived and efficiently executed. The Committee under Dean Henry Burlage did an excellent job in every way to make the meetings enjoyable and profitable for all who were fortunate enough to be able to attend.

I was particularly impressed with the seriousness of this group as it faced its many problems in this important phase of our teaching. Personnel shortage in this division of our curriculum makes administration of this program difficult. It was pleasing to note the group of fine young men and women tackling the huge task that lies ahead of them, and the realistic manner in which they plan to strengthen the course work in this field. Very soon I hope that no longer will these subjects receive their teacher assignments after the other courses have been adequately manned. Far too often it has been the duty of the administrative officers to q.s. staff teaching loads with these business subjects. Worse still, if all the staff had been "loaded" with teaching duties, the deans often took over this chore. With insufficient training, without head or heart in these assignments, it is no wonder that such subjects received a poor translation. Credit should be given teachers in the various schools of business administration who have aided us in working out our problems in these fields. Such staff experts can be most helpful, but I do not believe that they should assume this teaching assignment and allow our schools of pharmacy to wash their hands of all responsibility in the matter.

With the aid of the American Foundation for Pharmaceutical Education in teacher training and the cooperation and encouragement of our Association, this phase of our training cannot help but assume its rightful place in our curriculum.

#### AMBASSADORS WITHOUT PORTFOLIO

Every day and in every way, those of us engaged in pharmaceutical practice in all of its manifestations are serving to build up or tear down the pharmaceutical structure. In every act as retailer, teacher, researcher, or manufacturer, we are selling pharmacy every hour of the day. Public relations does not mean merely the launching of an expensive campaign in newspaper or television programs for our profession, for it also involves the effectiveness of each personal contact with customer or public in general.

The courteous act from behind the counter, the participation in community activities, the aid given by a teacher to a student all serve as a means of pointing up pharmacy in many ways each day. It is very fortunate that the good deeds far outweigh the bad. Each black mark against our record in one section of the country affects our reputation in another. Many daily crimes are committed in the name of pharmacy. The supercilious clerk, the cutting remark by a teacher to a pharmacy student, Rx substitutions, and slovenly dress and manners are just a few. It behooves each of us—teacher, student, and practitioner alike—to zealously guard the honor and fine reputation of our noble profession.

Too often, especially in prepharmacy years, we are careless in watching over our recruits and fail to aid in their motivation. This has resulted in "good salesmen" from other university departments being more successful in painting a rosy picture of their fields at the expense of pharmacy.

These are long-term investments in good will, and they can be so easily accomplished if each of us plays his part. There is another more immediate investment that we can make which will serve to aid all pharmacy—that is the International Meeting of Pharmacists next year.

#### FOURTH PAN-AMERICAN CONGRESS OF PHARMACY AND BIOCHEMISTRY

In the fall of 1957, the United States will be host to the first International Congress of Pharmacy held here since 1893. I refer to the Fourth Pan-American Congress of Pharmacy and Bio-



chemistry which will be held in Washington, D.C., during the week of November 3, 1957.

The organization of the Conference is under the able chairmanship of Dr. Robert A. Hardt, Vice President of Hoffman-LaRoche, with Mr. George Griffenhagen, Acting Curator of Medicine and Public Health, Smithsonian Institute, as Executive Secretary. Mr. S. Barksdale Penick, Jr., President of S. B. Penick and Co., will serve as Treasurer, with Mr. Oscar A. Zeitz, Assistant Treasurer and Controller of Roche, as his assistant.

The theme of this Conference is an excellent one: Planning the Advancement of Pharmacy throughout the Americas.

These Congresses are attended by representatives of almost all countries of Central and South America, Canada, and the United States. Practicing pharmacists, officers of national associations, representatives of pharmaceutical companies, members of educational institutions, research workers, all will be in attendance if past experience is any guide. In the past attendance has ranged from 800 to 3300.

What a challenge for pharmacy in sponsoring this stimulating project. The Congress offers an exceptional opportunity for pharmacy in the United States to cement better relations, pharmaceutically and otherwise, between the pharmacists of the Americas. Truly we are offered a real opportunity to be ambassadors without portfolio.

This meeting can provide a forum for interchange of ideas about problems related to education and licensure, as well as about other matters of scientific and professional advancement. Matters relating to drug export, drug control methods, pharmacy regulations, and many others can and will be profitably discussed.

Your AACP Executive Committee has offered the services of our organization and its membership, as a part of the good neighbor policy, to help in making this an outstanding event. I have accepted the chairmanship of the Program Committee. I know that you will accept your share of the responsibility when you are called upon for a committee assignment.

Harold G. Hewitt

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## EDITORIAL

Emblazoned against the sleek wall in a flamboyant script was the word "chemist." Inside it looked like most hotel pharmacies; it was cramped and cluttered. The gentleman who waited on me looked more like a pharmacist than a chemist; acted more like a grocer than a pharmacist! I wanted an article which is part of any pharmacy's stock. Traveling, I wanted it in a smaller size than it ordinarily was packaged. This seemed completely out of the realm of possibility in the thinking of the Berzelius behind the counter! It came in one size and that was the only way they sold it! Overtures to pay the price of re-packaging and for wasted material got me nowhere. Such suggestions seemed too incredible for this fugitive from a Grignard Reaction to fathom. I eventually bought the article "as is" and left, hoping I hadn't interrupted any attempts at sterol synthesis in the back room.

I decided to try another store for a pharmaceutical article. After all, who ever heard of a chemist handling Bonamine unless he was making it? The second store was the most elegantly appointed I have ever seen; it was what every professionally-minded pharmacist dreams of. I went in with a certain pride that only a pharmacist gets when he enters a store which represents his profession at its best. I asked for the Bonamine and was greeted by a man in a white coat who looked as though his hair had been caught in the electric fan, a man who neither smiled nor asked what I wanted. A grunt had indicated he was receptive to commerce. After that I never saw his eyes again. The purchase was returned to me unwrapped with the perfunctory statement of price. On the way out I noticed that the beautiful paneling looked very ostentatious!

That same day I went into a Danish store specializing in imported gift items. Met at the door by an immaculate young Dane, he seemed pleased that I wanted to look around. I bought several items, and I asked that some things be held until I was ready to pick them up. This was done with the intimation they were pleased to have the time to wrap the articles more carefully. When I did come back, another clerk retrieved the perfectly wrapped articles with the explanation

that the message had been left of my anticipated return and the location of the packages.

After this experience I was tempted to return to the "chemist" and the disheveled pharmacist and say, "Gentlemen, please visit the gift shop down the street. You profess a profession, you merchandise like mercenaries!"

These experiences are probably repeated thousands of times daily throughout the country. In the first instance, why does a pharmacist make himself ridiculous in the eyes of the public by calling himself a chemist! This from John Locke:

Affectation in any part of our carriage is but the lighting up of a candle to show our defects, and never fails to make us taken notice of, either as wanting in sense or sincerity.

Any intelligent person who has seen chemists' laboratories usually finds them anything but clean, anything but neat; the chemist anything but friendly, anything but helpful. Is a chemist a cut above a pharmacist? In whose eyes pray tell? Or have we become so conscious of the cut-rate stores that we feel the name pharmacy bears a stigma? The medical profession seems to ignore its abortionists! One wonders how many of these pharmacists who prefer to call themselves otherwise or who fail to act with pride and dignity in their profession know of their rich heritage of four thousand years of service to mankind. How many have been taught to be proud of what they are and lend their support to professional advancement? Who has failed to impress upon these people that a beautiful store can attract people, but in the words of Frederick Saunders, "No man who is not pleased with himself, even in a personal sense, can please others."

Have we as educators failed to pass a spark of professional *esprit*? Do we in our own reactions, appearance, and beliefs fail to exemplify that we represent a profession and believe in its practices?

If we have non-pharmacists on our faculties and they take pride in reminding students they themselves are not pharmacists, or if we have pharmacists on our staffs who apologize for being members of the profession (and there are such), may I suggest that they be relieved from any association with the potential practitioners of the calling they disparage. The students would appreciate it!

Then, even with the great shortage of potential teachers, we must be most chary in the choice of graduate students and young professors. We must all be very aware that pharmacists

who believe in themselves and the future of their profession are the salvation of pharmacy as it should be, and they must be taught by those who believe with evangelical fervor in that which they do.

Melvin R. Gibson

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*Just in proportion as we teachers inculcate high ideals and promote sound learning among our students, our successors, will pharmacy go forward and be exalted.*

H. Evert Kendig, *Am. J. Pharm. Ed.*, 4, 332 (1940)

## ANNOUNCEMENTS

**E. Mead Johnson Memorial Fellowship.** The American Foundation for Pharmaceutical Education announces the receipt of a gift from the Mead Johnson & Company Foundation, Inc., for the establishment of an annual graduate Fellowship memorializing the late E. Mead Johnson. The Fellowship is being immediately established as of September, 1956.

Edward Mead Johnson, reared on a farm in Pennsylvania and graduated from the University of Michigan Law School, became the founder of one of the nation's important nutritional and pharmaceutical manufacturing firms. He served as the first president from 1900 until his death in 1934.

Prior to that, and in 1893, he and his brothers, Robert Wood Johnson and James Wood Johnson, formed the firm of Johnson & Johnson in New Brunswick, New Jersey. He withdrew from that firm in 1900 and formed his own company under the name of American Ferment Company in Jersey City. The company changed its name in 1905 to Mead Johnson & Company, moved to Evansville, Indiana, in 1915 and developed as a producer of infant nutritional products.

He was an active civic worker, creating and sponsoring many important and extensive philanthropic enterprises, including the donation of the entire building for the Public Health Nursing Association in his home city of Evansville, Indiana.

Mr. Johnson died in 1934 at the age of 81, and this Memorial Fellowship is established in his honor and in recognition of his many contributions to the advancement of pharmacy and medicine.

All Memorial Fellowship recipients are selected by the AFPE Board of Grants, from among the total applicants for Foundation Fellowships.

The 1956-57 recipient of the E. Mead Johnson Memorial Fellowship is John Salvator Ruggiero, candidate for the Ph.D. degree at the University of Connecticut.

Other memorial programs of the Foundation are: Gustavus A. Pfeiffer Memorial Postdoctoral Fellowships; Edwin Leigh

Newcomb Memorial Awards; Sydnor Barksdale Penick Memorial Fellowships.

**Rhode Island Dean.** The roster of member colleges in the Summer issue indicated that a new dean would be chosen at Rhode Island College of Pharmacy and Allied Sciences. Dean W. Henry Rivard will continue in his post as Dean until July 1, 1957, at which time he will retire.

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*With even greater emphasis may I ask for proposals born of vision and constructive thought, to which we can address our efforts or commend the attention of our successors.*

H. Evert Kendig, *Am. J. Pharm. Ed.*, 4, 333 (1940)

## MEMORIALS

### **M. ROBERT BUCHDAHL**

Following one and one-half years of ill health, Dr. M. Robert Buchdahl died at the age of 34 on July 27, 1956, at the Ferguson-Droste-Ferguson Clinic in Grand Rapids, Michigan. He had been an associate professor of pharmaceutical chemistry at Ferris Institute since 1953.

Dr. Buchdahl received the B.S. degree from Union College in Schenectady, New York, in 1944; the M.S. degree in pharmaceutical chemistry from the University of Michigan; and the Ph.D. degree in pharmaceutical chemistry from the University of Minnesota in 1951. He taught at the University of Arizona and at the University of Minnesota as a graduate teaching assistant prior to coming to Ferris Institute. He was a member of Rho Chi, the American Chemical Society, the American Pharmaceutical Association, Kappa Psi, the American Association for the Advancement of Science, and the Society of Sigma Xi.

All of Dr. Buchdahl's many co-workers and friends in Big Rapids will not soon forget the courageous spirit that dominated this man as he carried on his teaching duties in spite of physical discomfort and hardship. His sparkling sense of humor, which made him popular with students and faculty alike, was not dampened by the long illness. With the cooperation of his wife, Mrs. Mary Jean Buchdahl, the M. Robert Buchdahl Memorial Scholarship Fund has been established at Ferris Institute for pharmacy students. (Richard E. Faust)

### **BERNARD VICTOR CHRISTENSEN**

Dr. Bernard Victor Christensen, 71, Dean Emeritus of the College of Pharmacy, The Ohio State University, died Thursday morning, September 13, 1956, at his home, 2230 Abington Road, Columbus, Ohio.

Dr. Christensen was Dean of the College of Pharmacy from 1939 to 1955. During his administration the College of Pharmacy made noteworthy changes. The faculty was increased from five, only one holding the Doctor of Philosophy degree, to ten, all but one holding the Ph.D. degree. A completely new curriculum was established consisting of two years of pre-pro-



fessional studies and three years of professional studies. This was the nation's first improved program of study for pharmacy. Graduate study in pharmacy became established at the College under his leadership, and as a result the College became known and respected the world over.

Doctor Christensen was born on a Wisconsin farm and educated in Wisconsin schools. He attended the State Teachers' College at Stevens Point, Wisconsin, and the University of Wisconsin, where in 1916 he received the B.A. degree. He received the M.S. degree in 1925 and the Ph.D. degree in 1927, both from the University of Wisconsin.

Before coming to Ohio State, he was head of the School of Pharmacy at the University of Florida.

Dr. Christensen was a member of the Masons and First Congregational Church. He is survived by his wife, Maude S.; one daughter, Mrs. Phyllis Ann Ogan and two grandchildren, Columbus; a sister, Mrs. Louise Kanneman, Westfield, Wisconsin, and two brothers, William C. and Norman G., also of Westfield.

He was a member and officer of many social, honorary, and professional organizations. Included among these were the American Pharmaceutical Association, President 1941-42, member of Council, 1941-1950; American Association of Colleges of Pharmacy, Chairman of Executive Committee 1943-1948, President 1949-1950; member of American Council on Pharmaceutical Education; past member Board of Directors, American Foundation for Pharmaceutical Education.

He was a charter member of the American Institute of the History of Pharmacy; a member of the Executive Committee of the United States Pharmacopoeia Committee on Revision, 1931-1950; chairman of sub-committee on volatile oils, 1932-1950, and member of the advisory committee on the Pharmaceutical Survey. He was also a member of the Ohio Academy of Pharmacists, Ohio State Pharmaceutical Association, Central Ohio Academy of Pharmacy and an honorary member of Kappa Psi, Rho Pi Phi, Phi Delta Chi, all pharmaceutical professional fraternities, and a member of Rho Chi, pharmaceutical honor society, and Sigma XI, scientific honorary. He was a Ebert prize winner for pharmaceutical research work while in Florida.

Dr. Christensen was nationally known as an author, having written four books dealing with the collection and cultivation of medicinal plants, and approximately twenty-five scientific papers, primarily concerning methods and procedures in biological standardization of drugs.

He dedicated his life to raising the standards of pharmaceutical education, believing that in this way the profession of pharmacy would be elevated. His contributions to the several professional organizations of which he was a prominent member form the basis on which the standards of education in the colleges of pharmacy throughout the land are being improved.

Dr. Christensen lived an exceedingly modest life. He did not seek personal acclaim. He was concerned only with the betterment of pharmacy. His relationships with his faculty and associates were characterized by dignity and respect. He was persevering in following through in everything he attempted, and expected others to do likewise. He worked unceasingly to obtain for his faculty academic rank and salary commensurate with their ability. He wanted nothing but the best in equipment and facilities for his faculty to work with.

His quiet manner carried through his home and social life. He liked all sports but was particularly interested in baseball and football. He was an avid reader of scientific and educational literature, yet he found time to read novels and general literature. He liked to play bridge and canasta. His passing leaves a void in the lives of so many who knew him. He was a trusted friend, a hard worker and a proud family man. (Earl P. Guth)

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*The pharmaceutical profession has an opportunity and a responsibility for constructive leadership in promoting the highest ethical standards—standards which make service the yardstick of success and confidence the guiding influence of the public in their pursuit of health.*

Franklin D. Roosevelt, *Am. J. Pharm. Ed.*, 2, 629 (1938)

## NEW LITTLE PEOPLE

- Daniel Lewis Schwartz**—born August 27, 1956, to Dr. and Mrs. Samuel M. Schwartz, George Washington University.
- William Delmon Easterly, III**—born August 2, 1956, to Dr. and Mrs. William D. Easterly, University of Arkansas.
- Michael John Wurdack**—born September 21, 1956, to Mr. and Mrs. Paul J. Wurdack, University of Pittsburgh.
- Gretchen Green**—born to Mr. and Mrs. Donald E. Green, Idaho State College.
- Ann Cecilia Webber**—born in May, 1956, to Dr. and Mrs. M. G. Webber, University of Houston.
- David Alan Susina**—born August 30, 1956, to Dr. and Mrs. Stanley Susina, University of Illinois.
- Carol Beth Holck**—born September 18, 1956, to Reverend and Mrs. Manfred Holck. (Carol Beth is a granddaughter of Dr. and Mrs. C. C. Albers, University of Texas.)
- Lisa Jean Sheffield**—born August 22, 1956, to Dr. and Mrs. W. J. Sheffield, University of Texas.
- William John Sica**—born July 25, 1956, to Dean and Mrs. Albert J. Sica, Fordham University.
- Susan Andrako**—born in June, 1956, to Dr. and Mrs. John Andrako, Medical College of Virginia.
- José Alejandro Santos**—born to Dr. and Mrs. Jesús Santos Martínez, University of Puerto Rico.
- Alden Carl Neva**—born July 13, 1956, to Dr. and Mrs. Arnold Neva, Duquesne University.
- Myron Manesterski**—born January 29, 1956, to Mr. and Mrs. Chester Manesterski, Duquesne University.
- Gary Fred Kearns**—born June 23, 1956, to Dr. and Mrs. James A. Kearns, Rutgers—The State University of New Jersey.
- David Walter Pratt**—born July 30, 1956, to Dr. and Mrs. Robertson Pratt, University of California.
- David Michael Tuck**—born August 4, 1956, to Dr. and Mrs. L. Dallas Tuck, University of California.
- David Mark Abrams**—born September 11, 1956, to Mr. and Mrs. Robert E. Abrams, Philadelphia College of Pharmacy and Science.

## MARRIAGES

- Dr. Marcus W. Jordin**, Assistant Professor of Pharmacology, University of Arkansas, to Miss Joan Christensen, July 28, 1956.
- Mr. Robert Paxinos**, Assistant Professor of Pharmacy, New England College of Pharmacy, to Miss Mary A. Peepas, August 19, 1956.
- Mr. Héctor Lozada Serrano**, Assistant Instructor of Pharmacy, University of Puerto Rico, to Miss Lillian Vega.
- Dr. G. Victor Rossi**, Associate Professor of Pharmacology, Philadelphia College of Pharmacy, to Mrs. Winifred E. Shiels, August 25, 1956.

## STAFF CHANGES

### NEW STAFF MEMBERS

- University of Connecticut.** Dr. Harold M. Beal has been appointed assistant professor of pharmacy.
- State University of Iowa.** Emily Penningroth and David Howard have been added to the hospital pharmacy staff as assistant hospital pharmacists.
- Montana State University.** Dr. Robert L. VanHorne has been appointed dean of the School of Pharmacy.
- University of Florida.** John Walter Kissel has been appointed assistant professor of pharmacology, and Edward P. Winters has been appointed instructor of pharmacy.
- George Washington University.** Dr. Charles J. Kokoski has been appointed assistant professor of pharmacy, and Dr. Samuel M. Schwartz has been appointed assistant professor of pharmaceutical chemistry.
- Drake University.** Dr. Maurice Andries has been appointed assistant professor of pharmacognosy and pharmaceutical chemistry. Mrs. Larissa Kaseoru has been appointed instructor of pharmacy.

**University of Kansas.** George N. Beckloff has been appointed instructor in pharmacy, and Dr. Robert J. Seiwald has been appointed research associate in pharmaceutical chemistry.

**University of Pittsburgh.** Dr. John W. Boenigk has been appointed associate professor of pharmacy.

**South Dakota State College.** Dr. Norval E. Webb has been promoted from instructor of pharmacy to assistant professor.

**Idaho State College.** Dr. Franklin Cole has been appointed assistant professor; Charles H. Barnstein has been appointed instructor of pharmacy; and Donald Schiffman has been appointed instructor in pharmacology. Marlin H. Felton has been appointed lecturer in hospital pharmacy.

**Florida A. and M. University.** Murphy D. Jenkins has been added to the staff.

**Medical College of South Carolina.** Dr. Dale H. Cronk has been appointed assistant professor of pharmacy.

**Butler University.** Dr. Bernard Ecanow has been appointed assistant professor of pharmacy. Dale Doerr has been appointed assistant professor of pharmacy administration.

**New England College of Pharmacy.** Dr. Irwin L. Hohigberg has been appointed associate professor and head of the chemistry department. Miss M. Ruth Norton has been appointed assistant professor of anatomy. Dr. Aleksey A. Sirontenko has been appointed associate professor of chemistry. Dr. Eugene A. DeFelice has been appointed associate professor of biochemistry and microbiology. Dr. Robert C. Crisafi has been appointed associate professor of pharmacy. Sabino W. Caputo has been appointed assistant professor of physics.

**University of Houston.** Dr. Bernard Misek has been appointed assistant professor of pharmacy. Dr. W. Homer Lawrence also has been appointed assistant professor of pharmacy.

**University of Illinois.** Dr. Ralph W. Morris has been appointed assistant professor of pharmacology.

**Fordham University.** C. J. Fiore has been appointed instructor of physiology and microbiology.

**Duquesne University.** Dr. Kenneth Liska has been appointed assistant professor of pharmacy.

**University of Washington.** Dr. Pierre Payot has been appointed assistant professor of pharmacognosy.

**Rutgers—The State University of New Jersey.** Stanford Engel has been appointed assistant professor of pharmacology.

**Philadelphia College of Pharmacy and Science.** Henry Schwaneger has been appointed instructor of German and English. Harold J. Goldman has been appointed instructor of physics.

### **CHANGES IN STAFF TITLES**

**Ferris Institute.** Clark A. Andreson, Associate Professor of Pharmacy, has been appointed acting dean of the Division of Pharmacy. Dr. Lloyd Poland and Dr. Arthur W. Reid have been added to the faculty.

**University of Florida.** Dr. Lea Gene Gramling has been promoted from associate professor of pharmaceutical chemistry to professor.

**George Washington University.** Dr. Robert M. Leonard, Associate Professor of Pharmacology and Pharmacognosy, has been appointed assistant dean of the School of Pharmacy.

**Oregon State College.** Robert P. Knott has been appointed instructor of pharmacy.

**St. John's University.** Anthony T. Buatti has been appointed acting chairman of the department of pharmaceutical administration. Curtis J. Heydorn has been promoted from instructor of biology to assistant professor. Dr. Paul T. Medici has been promoted from assistant professor of biology to associate professor.

**New England College of Pharmacy.** Robert Paxinos has been promoted from instructor of pharmacy to assistant professor. Dr. Clifford Coles has been promoted from associate professor to professor of biology and assistant dean.

**University of Houston.** Dr. Robert L. Boblitt has been promoted from assistant professor of pharmacy to associate professor.

**University of Illinois.** Dr. Donald M. Martin has been promoted from instructor of English to assistant professor. Alfred C. Core has been promoted to instructor.

**University of Texas.** Dr. W. J. Sheffield has been appointed assistant to the dean subsequent to the resignation from that position of Dr. W. R. Lloyd.

**Duquesne University.** Dr. Harold J. Rhodes has been promoted from assistant professor of pharmaceutical chemistry to associate professor.

**Xavier University.** Dr. James M. Crampton has been promoted from assistant professor of pharmacology to associate professor. Emile LaBranche has been promoted from assistant professor of pharmacy to associate professor. Dr. Ludmila Stass has been promoted from assistant professor of pharmacy to associate professor.

**University of California.** Dr. John J. Eiler has been appointed associate dean, and Dr. Sidney Riegelman has been promoted from assistant professor of pharmacy to associate professor.

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*. . . the pharmacist of the future will depend in the major part, upon the scholastic standards, the inspirational direction, and the professional integrity which our schools and colleges supply.*

Earl R. Serles, *Am. J. Pharm. Ed.*, 2, 465 (1938)



## GENERAL NEWS

**Christensen passes.** Dr. Bernard V. Christensen, retired Dean of the College of Pharmacy of Ohio State University, passed away in Columbus, Ohio, September 13, at the age of seventy-one. He is survived by his widow and a daughter.

**Burt A.Ph.A. President.** Dean Joseph B. Burt, University of Nebraska, has been elected President of the American Pharmaceutical Association for the 1957-58 year.

**Youngken to Rhode Island.** Dr. Heber W. Youngken, Jr., University of Washington, has accepted the deanship of the newly established College of Pharmacy of the University of Rhode Island at Kingston. He will assume his duties January 1, 1957.

**Wilson to Louisiana.** Dr. Ralph Wilson, former Dean of the Division of Pharmacy of Ferris Institute, has been appointed dean of the newly established School of Pharmacy of Northeastern Louisiana State College at Monroe.

**VanHorne to Montana.** Dr. Robert L. VanHorne, formerly associate professor of pharmacy at the State University of Iowa, has been appointed dean of the School of Pharmacy, Montana State University.

**Pittsburgh moves.** The School of Pharmacy of the University of Pittsburgh has moved into its new quarters in the newly constructed Schools of the Health Professions Building. All classes and all functions of the school are being conducted in these new facilities, which in addition to pharmacy, house the schools of medicine, dentistry, and nursing. All mail addressed to any of the staff or administration of the University of Pittsburgh School of Pharmacy should be addressed to the Schools of Health Professions Building, 3630 Terrace Street, Pittsburgh 13, Pennsylvania.

**Kappa Psi Research Award.** The National Scholarship Committee of Kappa Psi Fraternity has announced that Joseph D. Avellino, a recent graduate of the Philadelphia College of Pharmacy and Science, is the recipient of the Ray S. Kelley Memorial Research Award for 1956. Mr. Avellino is now enrolled in the Philadelphia College of Pharmacy and Science as a graduate student.

**College receives Schaefer gift.** Brooklyn College of Pharmacy was the recipient of a valuable collection of pharmaceutical antiques when retiring Dean Hugo H. Schaefer stepped down from his post after nineteen years of service to the college.

In a letter to Mr. Edward Neimeth, Chairman of the Board of Trustees of the school, Dr. Schaefer stated he had collected the antique mortars, pestles, bottled and packaged drugs, and other old items of the pharmaceutical trade during his forty years as a teacher in the profession. Mr. Neimeth said he felt the collection would have no better guardian than the school Dr. Schaefer is leaving after nearly two decades of service. Part of the collection is composed of native and foreign old drug urns, antique books on pharmacy subjects, plus one of the first microscopes ever made. The school estimated the value of the com-

bined collection at approximately \$2,000. Board Chairman Neimeth personally thanked Dr. Schaefer for his generous gift as the retiring dean prepared to take a long-delayed vacation trip to Europe. Upon his return, Brooklyn College of Pharmacy and the profession will fete Dr. Schaefer at a testimonial banquet to be held at the Waldorf Astoria on November 25.

**Report of new students.** Dean Louis C. Zopf, Chairman AACP Executive Committee, recently announced the following figures regarding admissions to schools and colleges of pharmacy:

**American Association of Colleges of Pharmacy  
Report on New Students Admitted—1955-56  
As Compared with 1954 and 1955**

|   |              | 1956        | 1955        | 1954         |
|---|--------------|-------------|-------------|--------------|
| <b>I Freshmen</b><br>(direct from<br>high school)                 | Men          | 2715        | 2896        | 2728         |
|   | Women        | 489         | 452         | 514          |
|   | <b>Total</b> | <b>3204</b> | <b>3348</b> | <b>3242</b>  |
| <b>II Students Admitted<br/>with Advanced<br/>Standing</b>        |              |             |             |              |
| Freshmen  | Men          | 772         | 692         | 687          |
|   | Women        | 94          | 94          | 95           |
|   | <b>Total</b> | <b>866</b>  | <b>786</b>  | <b>782</b>   |
| Sophomores  | Men          | 1664        | 1405        | 1290         |
|   | Women        | 180         | 182         | 173          |
|   | <b>Total</b> | <b>1844</b> | <b>1587</b> | <b>1463</b>  |
| Juniors   | Men          | 58          | 41          | 59           |
|   | Women        | 9           | 11          | 5            |
|   | <b>Total</b> | <b>67</b>   | <b>52</b>   | <b>64</b>    |
| Seniors   | Men          | 7           | 9           | 17           |
|   | Women        | 4           | 7           | 8            |
|   | <b>Total</b> | <b>11</b>   | <b>16</b>   | <b>25</b>    |
| Special   | Men          | 5           | 11          | 5            |
|   | Women        | 8           | 1           | 6            |
|   | <b>Total</b> | <b>13</b>   | <b>12</b>   | <b>11</b>    |
| <b>III Total Students<br/>Admitted with<br/>Advanced Standing</b> | Men          | 2506        | 2158        | 2058         |
|   | Women        | 295         | 295         | 287          |
|   | <b>Total</b> | <b>2801</b> | <b>2453</b> | <b>2345</b>  |
| <b>IV Total New Students<br/>Admitted</b>                         | Men          | 5221        | 5054        | 4799         |
|   | Women        | 784         | 747         | 802          |
|   | <b>Total</b> | <b>6005</b> | <b>5801</b> | <b>5601*</b> |

\*Total includes fourteen transient and pre-pharmacy students not classified in other columns.

**Degrees conferred in 1955-56.** Following is the tabulation of the totals for all degrees conferred by all member colleges within the academic year 1955-56 as reported by the Chairman of the Executive Committee. The report covers all degrees of the seventy-four member colleges located in the continental United States as well as the reports of the University of the Philippines and the University of Puerto Rico.

A total of 3239 Bachelor of Science degrees were awarded in 1955-56. If we deduct the sixty-seven Bachelor of Science in Pharmacy degrees granted by the University of the Philippines (forty-five) and the University of Puerto Rico (twenty-two), we arrive at the net figure of 3172 as the total number of Bachelor of Science in Pharmacy degrees conferred by member colleges in the continental United States.

|       | B.S. | M.S. | Pharm.D. | Ph.D. | Honorary | Total |
|-------|------|------|----------|-------|----------|-------|
| Men   | 2835 | 122  | 74       | 62    | 17       | 3110  |
| Women | 404  | 16   | 6        | 1     | 0        | 427   |
| Total | 3239 | 138  | 80       | 63    | 17*      | 3537  |

\* Includes nine Doctor of Science, six Doctor of Pharmacy, one Litt.D., and one LL.D. degrees.

**President's Committee on Education Beyond the High School.** Devreux C. Josephs, Chairman of the President's Committee on Education Beyond the High School, invited five leading educators to conduct "workshops" in five regions of the country to prepare for regional conferences to be held next spring.

The "workshops" are intended to lay the groundwork for the regional conferences and to recommend ways in which the President's Committee can stimulate discussion and action in the various regions on the problems of post-high school education.

In his letter of invitation to the educators, Mr. Josephs pointed out that the extent and nature of the problems of education beyond the high school differ widely from region to region and from state to state, and that therefore the "workshops" can ensure that the regional conferences focus discussion on the needs of each region.

Those invited to plan and conduct the regional "workshops" were Mr. Robert C. Anderson, Acting Director, Southern Regional Education Board, Atlanta, Georgia; Dr. B. L. Dodds, Dean, College of Education, University of Illinois, Urbana, Illinois; Dr. Harold L. Enarson, Director, Western Interstate Commission for Higher Education, Boulder, Colorado; Mrs. Charles Kerby-Miller, Dean, Radcliffe College, Cambridge, Massachusetts; and Dr. Carroll V. Newsom, Executive Vice Chancellor, New York University, New York City.

In his letter to the educators, Mr. Josephs said that the regional conferences "should result in the distillation of experience and opinions that will, on the one hand, aid citizens, administrators, and officials to meet those problems of prime importance and, on the other hand, aid the President's Committee in reaching conclusions and formulating the recommendations it is obliged to make to the President."

In appointing the Committee last April, the President requested the Committee to develop proposals, "through studies and conferences," for bettering opportunities for post-high school education. The regional conferences are a result of this charge.

In addition to the regional conferences, the Committee will conduct

studies of its own, the results of which are to be included in a report to the President by the end of 1957. For the purpose of making these studies, the Committee is divided into four subcommittees, each being concerned with one of the following problems: the demand for post-high school education now and in the next fifteen years; the resources to meet this demand; the proposals made for modification and improvement; and the appropriate relationships of the federal government to education beyond the high school.

The subcommittees met throughout the summer and reported their tentative findings to the whole Committee at a meeting on October 5, in Washington, D.C.

**VA research program.** A broader attack upon the "unknown" in man's major diseases will be started immediately by Veterans Administration.

VA said an enlarged medical research program will be conducted with the \$10,000,000 that Congress appropriated for fiscal year 1957, beginning July 1, 1956—\$4,300,000 more than was appropriated last year.

Most of the increased medical research will be concentrated in four areas of major diseases: 1. mental, nervous, and brain diseases (neuro-psychiatric); 2. heart and artery diseases (cardiovascular); 3. cancer and leukemia, and 4. problems of aging (geriatrics).

VA also will expand its research program in tuberculosis, in the fungus diseases which resemble tuberculosis, and in the infectious diseases.

In addition, VA said, renewed emphasis will be placed on individual research projects, such as the isolation and identification of the factors which produce man's greatest killer, hypertension or high blood pressure; the cause and nature of hardening arteries; the cause and nature of tissue changes (metabolic diseases), and the brain areas where epilepsy and related nervous disorders originate.

VA said it further plans to enlarge its cooperative study of drugs, old and new, for the treatment of specific diseases—a field in which the agency has pioneered with outstanding success because of its many hospitals, its large patient load, and its uniformity of approach.

VA and the armed forces already have achieved international recognition for their cooperative study of the so-called "wonder drugs" for tuberculosis. The findings of this study have been adopted by medicine throughout the world for the more successful treatment of one of man's oldest disease. This study will be extended and strengthened, VA said.

Other cooperative drug (chemotherapy) studies will be continued or instituted with the new available funds, VA said. They are:

1. The chemotherapy of multiple sclerosis for which no known cure is available.
2. The chemotherapy of psychiatric disorders, with special emphasis on the new tranquilizer drugs.
3. A cooperative study of the treatment of hypertension, or high blood pressure, with special reference to the use of newer drugs.
4. The chemotherapy of cancer, co-sponsored by the U.S. Public Health Service, the American Cancer Society and the U.S. Atomic Energy Commission.

In addition to these cooperative drug studies, VA said it will continue other types of cooperative studies such as those on the changes in lung function due to aging and disease, and on the effects of brain

surgery in the treatment of schizophrenia, one of the more serious mental diseases.

VA, with the help of the National Research Council and the Armed Forces Institute of Pathology, has accumulated extensive experience in the analysis of past clinical records, especially of World War I veterans, for the purpose of studying the life history of diseases from military induction onward.

Based on this experience, VA will conduct two important follow-up studies to make an evaluation of the natural course of coronary artery disease and coronary thrombosis, and an evaluation of the long-term results of chemotherapy of tuberculosis in which VA will study the fate of TB veterans treated with the new drugs since 1946 so as to evaluate the end results of different drug treatments.

In all of these studies, VA will be advised by the National Research Council Committee on Veterans Problems, the Statistical Agency of the National Research Council, and the Advisory Committee in Research of VA composed of outstanding leaders in American medicine who review the medical research programs in their own fields of specialization.

VA said its radioisotope laboratories will continue to be used in the expanded research program to develop new and precise techniques for laboratory and clinical investigations. These laboratories already have made possible fundamental research observations which have contributed to diagnostic and therapeutic methods, VA said.

VA added that because the radioisotope laboratories are widely spread throughout the country, they will increasingly contribute to research in preventive measures concerned with atomic hazards.

VA said its close affiliation with seventy-four medical schools permits it to profit by the experience and resources of the outstanding scientists in those institutions who work with, and lend support to, the VA medical care program.

The medical schools through their deans' committees supervise VA research programs and actively participate in the training of VA researchers.

This program of cooperation and collaboration, VA said, will be continued in the enlarged medical activities to provide better care for veterans and, indirectly, for people throughout the world.

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*Let there be no haste in our decisions, no emotion in our thoughts and no malice in our hearts.*

Earl R. Serles, Am. J. Pharm. Ed., 3, 417 (1939)

## COLLEGE NEWS

**University of Arizona.** Periodically the University pays tribute to illustrious Arizonans in many different ways. On October 9, Andrew P. Martin, pharmacist, civic leader, and philanthropist will be honored. The testimonial dinner given on his behalf will focus attention on a man who has given over fifty years of service to the people of this state and to his profession. The Editor's Section of this Journal, Winter, 1955, admirably describes the life of Andrew Martin and his leadership in improving and strengthening pharmacy in Arizona. It is fitting that the University officials chose to honor this eminent pharmacist during National Pharmacy Week. Dean Rufus Lyman, the first dean of the College of Pharmacy, will present the main address honoring Mr. Martin.

Two senior scholarships were made available by the Ryan-Evans Drug Company. The first is based on internship performance and serves to point out the value of good internship training. The second is based on scholastic performance in pharmacy management and business courses.

Four faculty members will attend the District 8 Meeting of Boards and Colleges of Pharmacy and the District Meeting of the American Pharmaceutical Association to be held in Las Vegas, Nevada, during October 4-6. Dean W. R. Brewer heads the group consisting of Dr. V. H. Simonian, Dr. Rex Call, and Mr. Richard Childs. (Joseph A. Zapotocky)

**University of Arkansas.** Dr. James E. Dusenberry, Chairman of the Department of Pharmacognosy, received a research grant from Eli Lilly Company to support work being done on the characterization of certain alkaloids. The most recent addition, which completes the series of composite pictures of the graduating classes of the school, is the one of the class of 1951-52. The entire series is on display at the school in its temporary quarters in the Graduate Center.

Dean Stanley G. Mittelstaedt and Professor Franklin S. Williams represented Arkansas at the Pharmacy Administration Conference held July 22-28 in Austin, Texas. It was found that Arkansas was one of a limited number of schools offering a required pharmacy administration curriculum that included at least fifteen semester hours of undergraduate work in this area.

The faculty attended the five sectional meetings of the Arkansas Pharmaceutical Association. The AFPE recruitment aid films were shown at all sectional meetings. Suggestions were given by the faculty as to the manner in which these films could best be utilized in various communities of the state.

A reception for all students was held at the University Medical Center on September 15.

Preparations are being made for the move to the new Medical Center to be made in the late fall or during the period between semesters.

The school has an increase in enrollment of 30 per cent the past year. (James E. Dusenberry)

**University of California.** The Pharmacy ROTC program at the University of California was terminated July 1, 1956. Major Nathan Cooper, Associate Professor of Military Science and Tactics, who was in charge of the local program since 1953-54, has been reassigned to Baylor University, School of Hospital Administration, as assistant professor of Hospital Administration, with duty at the Brooke Army Medical Center, Fort Sam Houston, San Antonio, Texas.

A two-day post-graduate seminar was held at the University of California Medical Center, September 27-29, through the collaboration of the School of Pharmacy and the Medical Extension Division. The program was designed to be of general interest to pharmacists, with a balanced program of new drugs, problems in their clinical use, pharmaceutical technology, dispensing techniques, professional problems, and practical pharmacy discussions. The program was attended by ninety-two registrants.

Eighty students were admitted to the Medical Center Campus of the School of Pharmacy in September, 1956. Twenty-five students are currently enrolled in the last year of the Doctor of Pharmacy program. In June 1956, the second class to receive the new degree, eight candidates were granted the degree of Doctor of Pharmacy.

Dr. E. Leong Way and his family have returned from Bern, Switzerland where Dr. Way spent a sabbatical leave during 1955-56 in the laboratories of Professor W. W. Wilbrandt of the Department of Pharmacology.

The continuing building program at the University of California Medical Center is being directed toward the completion of Increment II of the Medical Sciences Building. Increment II will provide additional facilities for pharmaceutical education. In addition, work is well under way on the Guy S. Millberry Student Union which will provide recreational facilities for both students and faculty, as well as living quarters for interns and nurses.

Mr. Stanley Marincik, Chief Pharmacist of the Hospital Pharmacy and Clinical Instructor in Hospital Pharmacy, suffered a heart attack early in the summer, but has recovered sufficiently to permit him to resume part-time duties.

Construction of the pyrogen-testing laboratory has been completed which will serve as one of the control units for the manufacture of bulk solutions in the Hospital Pharmacy and also for teaching proposed in the program of Hospital Pharmacy. (Donald C. Brodie)

**University of Colorado.** McKesson & Robbins, Denver Branch, played host to the Boulder County Retail Pharmacists and honored Dean and Mrs. Curtis H. Waldon at a banquet at Blanchard's Lodge on August 24. Members of the State Board of Pharmacy, the Executive Committee of the State Association, and faculty of the College of Pharmacy were guests. The film, *Design for Living*, was presented to Dean Waldon by McKesson & Robbins as a gift for the College of Pharmacy.

Dr. Charles F. Poe, Dean and Professor Emeritus, returned to Boulder in September and plans to continue research in his particular fields of interest as well as to teach and direct the courses in public health and antibiotics.



Several members of the faculty and students attended the annual meeting of District Eight of the AACP and NABP in Las Vegas, Nevada, on October 4-6. Dean Curtis H. Waldon was the moderator of a panel discussion on "The Pharmacy Internship Program." Dr. Harold C. Heim participated in the program on public health and presented a paper on "The Public Health Course for the Third Year of the Pharmaceutical Curriculum." Dr. Fred Drommond was the Chairman of the AACP Sessions. Mr. Richard Myers, President of the Colorado Student Branch of A.Ph.A., served as Chairman of the Student Sessions. Miss Iris Wallace, Secretary of the Colorado Student Branch, was a delegate at the meetings. Dr. Charles F. Poe also attended the meetings.

Dr. Harold C. Heim was a panel member at an open forum discussion on arthritis held at the National Bureau of Standards Auditorium on September 7. General George C. Kenney of New York City, National President of the Arthritis and Rheumatism Foundation, and Dr. Ronald Lamont-Havers, Associate National Medical Director from Boston, were in charge of the forum and reported on activities of the Foundation.

Professor Tony E. Jones attended the annual meetings of the American Pharmaceutical Manufacturers' Association in New York City, and also visited the Smith, Kline & French Laboratories in Philadelphia.

Visitors at the College of Pharmacy during the summer have been Dean P. A. Foote, University of Florida; Dean C. H. Larwood, University of Toledo; Dr. Hugh Ferguson, University of New Mexico; Dr. Chowdhuri, Head of the Food and Drug Bureau, Calcutta, India; and Dr. F. C. Hammerness, University of North Carolina. (Fred G. Drommond)

**University of Connecticut.** After more than twenty-seven years of teaching in pharmacy, Professor Augustus A. Maier has retired from the staff of the University of Connecticut School of Pharmacy as of September 16, 1956.

Mr. Bernard Misek has recently completed the requirements for the Ph.D. at the University of Connecticut School of Pharmacy. He has been appointed assistant professor of pharmacy on the staff of the University of Texas College of Pharmacy.

Harold M. Beal has returned to the University of Connecticut School of Pharmacy where he completed requirements for his Ph.D. in September of 1954. Dr. Beal, who spent two years teaching at the University of Florida College of Pharmacy, has been appointed assistant professor of pharmacy at the University of Connecticut.

Mr. Ara G. Paul, who recently completed requirements for his Ph.D. at the University of Connecticut, is joining the staff of Butler University as assistant professor of pharmacognosy.

Mr. Eugene N. Greenblatt has just completed requirements for his Ph.D. at the University of Connecticut, and has taken a position in research in pharmacology at the New York State School of Medicine at New York City.

After a two-year stay in the states during which time she received her Ph.D. at the University of Connecticut, Mrs. Luz Oliveros-Belardo has returned to her former position as dean of the pharmacy school at the Philippine Women's University in Manila.

Enroute home, Dr. Belardo enjoyed a several months extended trip

with her husband, Dr. Ricardo Belardo, through the British Isles and the European countries.

The University of Connecticut School of Pharmacy in conjunction with other university schools and departments held an open house on the morning of October 6, 1956. This all-university open house, preceding a football game with Rutgers University, is part of the University's Diamond Jubilee Celebration lasting from September, 1956, through June, 1957.

This year the University of Connecticut School of Pharmacy opened its doors to the largest student population in its history. As of this writing there are one hundred-thirteen freshmen, ninety-two sophomores, seventy-five juniors, eighty-nine seniors, and thirteen graduate students.

In keeping with the regional program instituted by the university, the number of New England students in the freshman class was considerably larger this year. There were five from Maine, eleven from Massachusetts, eight from New Hampshire, and one each from Rhode Island and Vermont.

At the recent meeting of Biological Societies sponsored by the American Institute of Biological Sciences at the University of Connecticut in August, several members of the Faculty of the School of Pharmacy helped to make the meetings a success. Mr. A. E. Schwarting acted as local chairman for the American Society of Plant Physiologists and also served on the exhibits committee. Mr. P. J. Jannke served as chairman of exhibits. Mr. Richard K. Thoms served on the exhibits committee, and Mr. Donald M. Skauen and a number of graduate students served in various capacities at the registration desk and in some of the sessions held in the School of Pharmacy. (Walter R. Williams)

**The George Washington University.** Dr. Salvatore J. Greco, Associate Professor of Pharmacy, resigned to accept an administrative and teaching position at the Creighton University College of Pharmacy. Dr. Greco has been replaced by Dr. Charles J. Kokoski, who completed his undergraduate and Ph.D. degrees at the University of Maryland.

Dr. Willis E. Moore, Assistant Professor of Pharmaceutical Chemistry, resigned to accept a position in research at the Winthrop Laboratories, Rensselaer, New York. Dr. Moore has been replaced by Dr. Samuel M. Schwartz, who received his B.S. degree in pharmacy from the University of Manitoba and the Ph.D. degree in pharmaceutical chemistry at the University of Minnesota. During his undergraduate training, Dr. Schwartz was awarded gold medals by the University of Manitoba and by the Manitoba Pharmaceutical Association for highest standing in the second, third, and fourth years of pharmacy curriculum.

Mr. Gust G. Koustenis has been awarded an American Foundation for Pharmaceutical Education Teaching Fellowship for the academic year to continue his graduate studies for a masters degree in business administration. (Robert M. Leonard)

**Florida A and M University.** J. H. Brown, Instructor in Pharmacognosy, is on leave of absence to do graduate study at the University of Minnesota. (Howard McClain, Jr.)

**University of Florida.** Albert R. Haskell, Ph.D. in pharmacology in August, is now with Jensen-Salsbury, of Kansas City. Robert C. Crisafi,

Ph.D. in pharmacy in August, is now with the New England College of Pharmacy.

Dean P. A. Foote served as Chairman of the Pensacola meeting in August of the Southeastern District of Boards and Colleges.

Dr. Charles H. Becker spoke on September 10 to the Central District Dental Society in Ocala on "Dental Prescriptions," stressing mainly the antibiotics, anti-infectives, analgesics, and sedatives. (Carl H. Johnson)

**University of Illinois.** Ralph W. Morris, Ph.D., newly appointed assistant professor of pharmacology, is a graduate of the University of Iowa. Dr. Morris was a member of the Department of Pharmacology of the College of Medicine of the University during the last year.

Promotions: Dr. Donald M. Martin received his doctorate in English from the University of Michigan during the summer. Mr. Alfred C. Core received his master's degree in chemistry at the June graduation. (Ralph E. Terry)

**Butler University.** Dr. Bernard Ecanow who recently received the Ph.D. degree from the University of Minnesota has been appointed assistant professor of pharmacy.

Mr. Dale Doerr has been appointed assistant professor of pharmacy administration. Mr. Doerr has studied at Drake University and the University of Illinois. He has been instructor at the University of Illinois.

Four pharmacy students received the B.S. degree at the August commencement.

Miss Imogene Piper, B.S. '48, was elected president of the National Lambda Kappa Sigma Sorority.

Mr. Dale Doerr, who assumed his duties as assistant professor of pharmacy administration September 1, attended the Pharmacy Administration Teachers' Seminar held in Austin, Texas, this summer.

Mr. Spurling Clark, B.S. '37, was elected president of the National Pharmaceutical Association and took office at the organization's tenth annual convention at Detroit on August 4.

New equipment purchased by the college included a number of prescription balances, kymographs, and microanalytical apparatus. Projected plans call for the establishment of a radioisotope laboratory. (Edward J. Rowe)

**Purdue University.** Norris W. Dunham has completed requirements for the Ph.D. degree with a major in pharmacology. He now holds the position of assistant professor of pharmacology at the Ferris Institute, Big Rapids, Michigan.

Robert Schlembach completed requirements for the Ph.D. degree with a major in pharmacology. He is now an assistant professor of pharmacology at Toledo University.

Leo P. Gagnon, who completed work for the Ph.D. degree in pharmacy, has accepted a position with the Miles Laboratories in Elkhart, Indiana.

Charles Kolstad completed requirements for the Ph.D. degree in pharmacy and is now on the staff of Pfizer and Company. (Gustav Cwalina)

**Drake University.** Dr. Maurice Andries has been appointed assistant professor of pharmacognosy and pharmaceutical chemistry. Dr. Andries comes to Drake from the University of Washington at Seattle.

Mrs. Larissa Kaseoru has been appointed instructor in pharmacy. Mrs. Kaseoru received her bachelor of science in pharmacy at Drake in 1953. She is completing her thesis for a master of science degree in pharmacology from Drake.

The college has received a grant for 1956-57 from the Dow Chemical Company to support a continuation of a study on methods of evaluating rodent repellants when applied to paper cartons.

Two foreign students, one from India and the other from Egypt, are registered in the college this year. (Byrl E. Benton)

**University of Kansas.** Dr. J. H. Burckhalter and family returned in August from Tübingen, Germany, where he had been a Fulbright Fellow during the past year. (Raymond E. Hopponen)

**New England College of Pharmacy.** Classes began September 17 with 250 students enrolled to date. The main college building has been extensively redecorated. A financial drive is now in progress to build up an endowment fund for the college, and results for the first few weeks of the drive are highly encouraging.

The following additions to the staff have degrees as shown following their names: Irwin L. Hohigberg (Ph.D. 1957, University of North Carolina); Miss M. Ruth Norton (M.S. 1949, Massachusetts Institute of Technology); Aleksey A. Sirotenko (Ph.D. 1946, University of Munich); Eugene A. DeFelice (M.D. 1956, Boston University); Robert Crisafi (Ph.D. 1956, University of Florida); Sabino W. Caputo (M.Ed. 1951, Boston Teachers College). (Clifford H. Coles)

**Ferris Institute.** On November 7, 1956, the Division of Pharmacy of Ferris Institute will present the Fourth Annual Pharmacy Seminar in the new Masselink Commons Building on the campus. Last year approximately eighty-five Michigan pharmacists attended the affair, and this fall an even greater registration is expected.

The new \$1,400,000 Pharmacy-Science Building is ready for use this fall, and dedicatory ceremonies are now being planned. In addition to spacious laboratory, lecture, and faculty office facilities in the main section of the building, an adjoining structure will house an auditorium capable of seating 300 persons.

Dr. Lloyd Poland and Dr. Arthur W. Reid have joined the pharmacy staff this fall. Dr. Poland has the A.B. degree from Butler University, the M.A. degree from Syracuse University, a Ph.D. degree from Cornell, as well as the B.S. degree in pharmacy from Butler. He has taught chemistry and physics at Syracuse, Cornell, and Illinois State Normal College, and has held the rank of full professor at Butler for seven years prior to operating his own pharmacy in Indianapolis.

Dr. Reid holds the B.A. degree from Depauw, the M.A. degree from Indiana University, and Ph.D. degree from the University of Florida. He has been a lecturer in economics and psychology at the Indianapolis College of Pharmacy; audit clerk for the procurement division of the Treasury Department in Washington, D.C.; examiner in pharmacy and science, U.S. Civil Service Commission, Washington, D.C.; assistant professor of pharmacy at Butler University and assistant professor of pharmacy at the University of Florida. He comes to Ferris from the Detroit Insti-

tute of Technology, where he was an associate professor of pharmacy administration.

Dr. Richard E. Faust was employed during the summer months by the Upjohn Company, where he was engaged in research on the development of new oral dosage forms.

Dr. Karlis Kazerovskis attended the Thirty-third Annual Plant Science Seminar held in St. Louis, Missouri, in August.

Dr. Norris Dunham has recently completed his work for the Ph.D. degree in pharmacology from Purdue University. He has been on the staff of the Division of Pharmacy since 1953.

Mr. DeHaven, and Drs. Platcow, Dunham, Reid, Poland, and Faust attended the meeting of the Michigan State Pharmaceutical Association in Detroit on September 25.

Dr. M. Robert Buchdahl, Associate Professor of Pharmaceutical Chemistry at Ferris, died at the age of thirty-four on July 27, 1956, following a year and one half of ill health. The courage, stamina, and resourcefulness with which Dr. Buchdahl carried on these past few months has been a source of inspiration to his many friends and associates here at Ferris Institute.

Dr. Norris Dunham presented a talk before the Michigan branch of the A.Ph.A. last June entitled "Recent Developments in Mental Health Drugs." (Richard E. Faust)

**Wayne State University.** Dean Stephen Wilson and Professor Ralph Mill attended the Teachers' Seminar on Pharmacy Administration of the American Association of Colleges of Pharmacy in Austin, Texas, July 22-27. Dean Wilson presented a paper entitled "Horizons of Pharmacy Administration—Past and Future" and served as a member of the panel on "Problems of Graduate Program Development."

Dean Stephen Wilson spoke about business subjects in the pharmacy curriculum at the National Pharmaceutical Association convention. Dr. Melvin F. W. Dunker and Dr. Richard K. Mulvey presented papers at the convention. The titles of the papers were—"Some New Synthetic Medicinals" and "The Impact of the Ataraxic Drugs," respectively. The convention was held in Detroit, Michigan, August 2-4.

Dr. Harold E. Bailey has been elected President of the Plant Science Seminar for the year 1957. (August G. Danti)

**University of Minnesota.** Mrs. Muriel Heisterkamp assumed her duties as departmental librarian in July.

The following equipment was acquired during the summer: nofluorophotometer nephelometric assembly with continuous dialyzer, precision scientific incubator, precision scientific convection oven, large stainless steel refrigerator, homoloid machine with tachometer, surface tensiometer, dispersion mixer-pilot plant model, polarograph, extensive chromatographic equipment, three torsion prescription balances.

At summer commencement exercises Klaus R. Fiedler received an M.S. degree, and Bernard Ecanow and Samuel M. Schwartz received Ph.D. degrees. Drs. Ecanow and Schwartz have accepted assistant professorships at Butler and George Washington Universities, respectively.

Rearrangement of physical facilities in a ground-floor area has resulted in doubling the floor space devoted to manufacturing pharmacy. (Charles V. Netz)

**The University of Kansas City.** Mr. and Mrs. Lyle Willits spent their vacation in Bermuda this summer visiting Mrs. Willits' family. Before their arrival in Kansas City, Dr. and Mrs. Sam T. Coker vacationed at Gulf Shore State Park in Alabama.

Dr. and Mrs. William J. Rost visited relatives in Minnesota and North Dakota early this fall. More equipment has been purchased for the radioactive laboratory this fall. For the first time, a course in radioactive isotopes was offered this semester. Dr. Sam T. Coker will be in charge of the course. Dr. Coker will also teach a course in toxicology which will be another new addition to the curriculum. (William J. Rost)

**University of Nebraska.** Dr. Varro E. Tyler, Jr., Associate Professor of Pharmacognosy and Chairman of the Department, has been granted a leave of absence for two weeks beginning October 3, for the purpose of attending the International Conference on Alkaloidal Biosynthesis to be held in Quedlinburg, East Germany, under the sponsorship of the German Academy of Science. This meeting is of special interest to him because of his research activities in connection with the saprophytic production of ergot alkaloids and allied products. Dr. Tyler spent four weeks in Europe last spring visiting laboratories and consulting with experts in this field.

Dean Joseph B. Burt was notified on September 8 of his election as President of the American Pharmaceutical Association for the 1957-58 term. His installation will be held at the final session of the annual convention, to be held at New York City, April 28-May 3, 1957. (Phyllis Platz)

**Rutgers—The State University of New Jersey.** Mr. Stanford Engel has joined the faculty as assistant professor of pharmacology. Mr. Engel has completed all course requirements for his doctorate at Columbia University, College of Physicians and Surgeons.

The Second Pharmaceutical Marketing Orientation Seminar, a series of sixteen weekly lectures and demonstrations, is being conducted under the joint sponsorship of the Rutgers Pharmacy Extension Service and the Pharmaceutical Advertising Club during the months of September, 1956, through January, 1957. The first lecture in the series was delivered late in September by Mr. John A. McCartney of Parke, Davis and Co., President of the American Pharmaceutical Association. His talk, "The Pharmaceutical Industry," was a helpful and authoritative survey by an individual in an excellent position to report significant trends in the industry. The second lecture was delivered early in October by George M. Sieger of Lederle Laboratories Division, American Cyanamid, whose subject was, "Clinical and Pharmacological Research on New Product Problems." Other talks by executives and research experts are scheduled for future weeks.

Professor R. George Kedersha attended the seminar for teachers of pharmacy administration held at Austin, Texas, this past summer. He also served two weeks of active naval training duty as a lieutenant commander with the Bureau of Medicine and Surgery, Washington, D.C. As a member of the Armed Forces Medical Material Standardization Committee he reviewed military characterizations of biologicals and chemicals purchased by the armed forces.

Dr. James A. Kearns also served two weeks of active military duty.



As a navigator with the Air Force, he made flights to Iceland and Germany. (Morton J. Rodman)

**University of New Mexico.** Donald Weintraub has been awarded an American Foundation for Pharmaceutical Education scholarship for the 1956-1957 academic year.

The senior class will be absent from the University the week of October 14 on an inspection trip to the Abbott Laboratories and the Eli Lilly Company plant.

Dean E. L. Cataline traveled to Gallup September 27 to speak to the Kiwanis Club of that city. His subject was "Education for a Changing Profession."

The annual Senior Banquet sponsored by the Kappi Psi fraternity was held at the Alvarado Hotel May 5 at which time Dean Cataline named the recipients of the Lehn & Fink Medal, Merck Award, Bristol Award, and the H. E. Henry Award. (George L. Baker)

**Fordham University.** Dr. Walter J. Schubert read a paper entitled, "On the Mechanism of Lignification," on September 19, 1956, at the fall meeting of the American Society, held at Atlantic City, and was the coauthor of a paper on the isolation of cellulase enzyme from a wood-destroying mold, also read at the same meeting.

Dr. Albert J. Sica, Chairman of the Professional Relations Committee of the Pharmaceutical Council of Greater New York, supervised the installation of a professional exhibition of ophthalmic preparations at the annual drug show of the Council, held September 23-25, 1956.

Dr. Schubert participated in the Third Lignin Round Table held at the Institute of Paper Chemistry at Appleton, Wisconsin, from September 24-26, 1956.

Dean Albert J. Sica officiated at the installation of the newly elected officers of the Pharmaceutical Council at an installation dinner held on September 30, 1956. (Alfred J. White)

**St. John's University.** Dr. Paul T. Medici, Associate Professor of Biology, received his Ph.D., with a major in endocrinology from New York University on June 6, 1956.

The First Annual Alumni Banquet of St. John's University College of Pharmacy was given in honor of retiring Dean John L. Dandreaux on May 20, 1956, at the Waldorf-Astoria Hotel in New York City. Dr. Dandreaux, founder and first dean of the College of Pharmacy (1929), was named dean emeritus of the College of Pharmacy by the Very Reverend John A. Flynn, President of St. John's University, at this dinner. The Alumni Association of the College of Pharmacy presented to the University an oil painting of Dr. Dandreaux that is to be hung in the Science-Pharmacy Building which is to be constructed on the university's campus in Jamaica, New York.

On October 2, 1956, the faculty of St. John's University College of Pharmacy will sponsor a reception dinner for Dr. Andrew J. Bartilucci, new dean of the College at Cavanagh's Restaurant in New York City.

Several graduates of the Class of 1956 of St. John's University College of Pharmacy have entered various schools of business administration for the purpose of procuring B.B.A. degrees. (Andrew J. Bartilucci)

**Ohio State University.** Dean Lloyd M. Parks and Dr. Loyd E.



Harris attended a meeting of the Richland County Pharmaceutical Association in Mansfield, Ohio, July 12.

Dean Lloyd M. Parks attended an organization meeting August 12 of the Wayne Pharmaceutical Association in Wooster, Ohio, and a meeting of the Clark County Pharmaceutical Association in Springfield, Ohio, August 22.

Dr. Jack L. Beal attended the Plant Science Seminar at St. Louis, Missouri, August 20-24.

Dr. Loyd E. Harris spent two weeks of active duty at the Chemical Warfare Laboratory, Army Chemical Center Maryland, September 17-28. Dr. Harris is a colonel in the Army Reserve of the Chemical Corps. (Jack L. Beal)

**Oregon State College.** Dr. R. S. McCutcheon has returned from his sabbatical leave which was spent at the Georgia College of Medicine pursuing post-doctorate research. His research activities were made possible by a grant from the U.S. Public Health Service.

Dr. Muriel C. Vincent resigned her position as assistant professor in pharmacy to accept a position at North Dakota. Dr. Vincent was on the staff two years.

Dr. Daniel P. N. Tsao received a \$700 grant-in-aid from the General Research Fund of the Graduate School to pursue work on pharmacognosy. His work involved investigations of solanaceous drugs, and isolation of a smooth muscle relaxing principle from a Chinese plant.

Dr. Robert V. Petersen was awarded a \$475 grant to carry on work on the synthesis of organic medicinals. (Leo A. Sciuchetti)

**Philadelphia College of Pharmacy and Science.** President Ivor Griffith was one of the featured speakers at the NARD Convention in Cincinnati, September 21. Registrar John E. Kramer, Assistant Dean L. F. Tice, and Dr. Lewis C. Scheffey, president of the College of Physicians of Philadelphia, greeted the 200 incoming students on September 21. Plans have been completed for a dormitory for women students. Members of the faculty will participate on the WFIL-TV University of the Air with fifteen lectures on health topics. The U.S. Department of Agriculture has awarded a research grant to the College to study the possible utilization of honey in medicinal formulations. (John E. Kramer)

**Temple University School of Pharmacy.** Dr. David E. Mann, Assistant Professor of Pharmacology, visited Scotland during the summer. While in Glasgow he conferred with Dr. Paul P. Peacock of the Royal Beatson Memorial Hospital who is presently engaged in lung cancer research. Dr. Peacock is attempting to induce lung cancer in chickens by introducing cigarette smoke into their air sacs. In mid-July Dr. Mann lectured to student nurses at Stracathro Hospital, Brechin, Scotland, on the subject, "Cigarettes versus Lung Cancer." Later on, in Edinburgh, Dr. Mann met Dr. J. Gaddum, Professor of Pharmacology at the University of Edinburgh, who showed Dr. Mann through his extensive laboratory.

Dr. Frank H. Eby attended the 33rd Annual Plant Science Seminar at the St. Louis College of Pharmacy from August 20 to 24. Dr. Eby presented a paper at the seminar entitled, "Importance of Visual Aids in Teaching Micro-Pharmacognosy."

Dean Joseph B. Sprowls greeted the faculty at a luncheon on September 10, which was in honor of Dr. and Mrs. Arthur E. James. Dr. and Mrs. James recently returned to the United States after a stay of approximately one year in Pakistan where Dr. James, Professor of Inorganic Chemistry, had been lecturing and conducting research under a Fulbright Grant.

S. Walter Foulkrod, Jr., Esq., Lecturer on Pharmaceutical Law, Dr. David E. Mann, Jr., and Dean Sprowls attended an open hearing on September 11, in Harrisburg, Pa., to discuss new regulations under the New Dangerous Drug Law of Pennsylvania. Mr. Foulkrod and Dr. Sprowls offered testimony.

Mr. Fred B. Gable, Assistant to the Dean, greeted freshman pharmacy students on September 12 at Camp Hilltop, Downingtown, Pennsylvania. The three-day camping program is arranged by the University for freshmen each year, for it permits new students to meet informally and serves as a preliminary orientation.

Dean Sprowls addressed the Montgomery County Dental Society on September 24. His topic was, "Possible Uses of New Drugs in Dentistry."

Dean Sprowls will preside as chairman for the colleges at the District Number Two Meeting of Boards and Colleges which will be held at the Traymore Hotel in Atlantic City, New Jersey, October 25 to 27. (Fred B. Gable)

**University of Pittsburgh.** Dean Edward C. Reif has been appointed to membership on the Committee on Education and the Committee on Legislation of the Pennsylvania Pharmaceutical Association. Mr. William L. Blockstein has been appointed to membership on the Committee on Professional Relations of the Pennsylvania Pharmaceutical Association.

In attendance at the 1956 Plant Science Seminar were Dr. Edward P. Claus, Mr. Norman R. Farnsworth, Instructor in Biological Sciences, and Mr. Max Sherman, graduate student assistant in pharmacognosy. Messrs. Farnsworth and Sherman presented a paper, "An Hourly Atmospheric Study of Allergenic Pollens."

Publication of the third edition of *Gathercoal and Wirth Pharmacognosy*, by Dr. Edward P. Claus, has recently been completed by Lea and Febiger of Philadelphia. (William L. Blockstein)

**University of Puerto Rico.** Mr. Rodolfo Escalí, Associate Professor of Pharmacy, finished his Ph.D. degree at Purdue University. His major field was industrial pharmacy; he is now in charge of the course in manufacturing pharmacy. Dr. Alvaro Albuquerque, a noted pharmacist and physician from Rio de Janeiro, Brazil, was the main speaker of the Annual Convention of the Puerto Rico Pharmaceutical Association (Colegio de Farmacéuticos de Puerto Rico). He was invited by the College of Pharmacy and the Association. Dr. Albuquerque has made a large number of contributions in the field of the sulfa drugs and in antibiotics for which he has received wide recognition.

The dean of pharmacy, Mr. Luis Torres Díaz, received a medal from Dr. Albuquerque from the Brazilian Institute of the History of Medicine as an honorary member since 1949. He also received one from the American Institute of History of Pharmacy. Dr. Esteban Núñez, Associate Professor of Pharmacognosy and Secretary of the Puerto Rico Pharma-

ceutical Association; Mr. Esteban Amador, President of the Puerto Rico Pharmaceutical Association; Mr. Monserrate Anselmi, past President of the Puerto Rico Pharmaceutical Association; Mr. Washington Llorens, President of the Board of Pharmacy; and Dean Torres Díaz received diplomas of honorary membership (corresponding members) of the pharmaceutical associations of the different Brazilian districts. Dr. Albuquerque gave two lectures to the pharmacy students on the pharmacy in Brazil and on the pharmaceutical industry in Brazil.

Mr. Angel L. Igesias, Assistant Professor of *Materia Medica*, is on sabbatical leave at the Ohio State University, taking graduate courses in pharmacology working toward the Ph.D. Mr. Héctor Lozada Serrano, Assistant Professor of Pharmacy, is also on sabbatical leave at the same university taking graduate courses in pharmacy. (Esteban Núñez-Meléndez)

**Medical College of South Carolina.** Dale H. Cronk, who received his Ph.D. at the State University of Iowa in August, has been appointed assistant professor of pharmacy.

A marked increase in enrollment is anticipated for 1956-57 session. (William A. Prout)

**South Dakota State College.** Mr. Norval E. Webb has resumed his teaching duties after a leave of absence spent at Purdue University, School of Pharmacy, where he was awarded the Doctor of Philosophy degree. He rejoins the faculty as assistant professor of pharmacy.

Dr. G. C. Gross on September 10 addressed a group of medical students at the University of South Dakota, College of Medicine, on the subject, "Interprofessional Relations."

A chapter of Kappa Epsilon was established during the Spring Term, 1956.

Dr. Harold S. Bailey on September 11 addressed the Madison (South Dakota) Chapter of AAUW on the subject, "Problems Facing Higher Education."

Dr. Harold S. Bailey has been reappointed for the fourth year as associate editor of the *South Dakota Journal of Medicine and Pharmacy*.

John Borchert, who graduated June, 1956, has been appointed graduate assistant in pharmaceutical chemistry.

Dr. Kenneth Redman presented a fifteen-minute television program on first aid during August.

Dr. Winthrop Lange attended the Fifth National Chemistry Symposium of the American Chemical Society held at East Lansing, Michigan, June 21-22, 1956. (Clark T. Eidsmoe)

**University of Houston.** Dr. N. M. Ferguson, Dean of the College of Pharmacy, attended the Plant Science Seminar in St. Louis in August, 1956, and presented a paper entitled "Aims in the Laboratory Course in Pharmacognosy."

Word was recently received that Dr. Ferguson has been appointed as a member of the organizing committee of the 4th Pan-American Congress on Pharmacy and Biochemistry. The Congress, which is to be held in the fall of 1957, at Washington, D.C., will represent all pharmaceutical interests in the United States, Canada, Mexico, and Central and South America. In December, 1954, Dr. Ferguson represented American pharmaceutical education, and delivered papers at the 3rd Pan-American

Congress in Sao Paulo, Brazil.

Of the new staff members, Dr. Bernard Misek, Assistant Professor of Pharmacy, from the University of Connecticut, will teach general pharmacy and pharmaceutical mathematics. Dr. W. Homer Lawrence, Assistant Professor of Pharmacy, from the University of Maryland, will teach physiology and pharmacology. (Sue H. Rouse)

**University of Texas.** The fifth annual refresher course in pharmacy will be sponsored by the College on November 28-29. The program will cover such subjects as insulin therapy, cancer research, dental preparations, tranquilizing drugs, and other informative topics.

The Teachers' Seminar of Pharmacy Administration was conducted on the University Campus from July 20-27, and was attended by approximately eighty out-of-town teachers and administrators.

The College of Pharmacy, in cooperation with the Division of Extension of the University, conducted a Management Conference in Plainview on September 9. Professor E. V. Lofgren and Professor Wallace Guess appeared on the program to discuss prescription pricing. A similar management conference will be staged in Corpus Christi on October 17-18.

At this writing, unofficial figures indicate that approximately 515 students are enrolled in the College of Pharmacy, including four undergraduate negro students. This year marks the first that negro students have been admitted to the University at the undergraduate level by order of the board of regents.

Dr. and Mrs. W. R. Lloyd spent a part of the summer vacation visiting relatives and friends in North Carolina. Dr. and Mrs. Davis spent a brief vacation in California. Dr. and Mrs. C. O. Wilson and family spent the early part of the summer visiting in Washington state. (C. C. Albers)

**Medical College of Virginia.** The Virginia Society of Hospital Pharmacists will meet on October 27, 1956, in Newport News, Virginia. Mr. Russell Fiske, Chief Pharmacist at the Medical College, is vice-president, and Miss Mary Ann Magee, Assistant Pharmacist, is secretary.

The College has five new graduate students, four in pharmaceutical chemistry and one in hospital pharmacy. (Milton L. Neuroth)

**State College of Washington.** Dean Haakon Bang took a trip to the Midwest in August where he visited colleges of pharmacy at the State University of Iowa, University of Kansas, University of Kansas City, University of Illinois, and Drake University.

Dr. Allen I. White held a special appointment this summer to aid the administration in reorganizing procedures for handling matters relating to educational policies.

Mr. Richard J. Hampton attended the summer session at the University of Wisconsin where he started work toward a Ph.D. degree in pharmacy administration. Mr. Hampton also attended the Pharmacy Administration Teachers' Seminar at the University of Texas.

Dean Haakon Bang, Dr. Allen I. White, Dr. Charles F. Martin, Dr. E. Roy Hammarlund, and Dr. Paul M. Scott attended the convention of the Washington State Pharmaceutical Association at Spokane in June.

Two masters degrees, one in pharmacognosy, and the other in manufacturing pharmacy, were awarded this summer. (V. N. Bhatia)

**University of Washington.** Dr. H. W. Youngken returned September 8 from two months abroad during which time he visited Drs. Trease and Evans at the University of Nottingham, and Dr. Fairburn at the University of London. At the latter institution he participated in a conference on pharmacology. Dr. Youngken also attended the International Congress on Physiology and Pharmacology in Brussels. He then visited the Pharmaceutical Institute of Technology in Zurich, and the Sandoz Pharmacological Institute in Basle.

A public health service grant in excess of \$18,000 was awarded to Dr. Youngken for a two-year program studying biologically active constituents from drug plants.

Dr. Pierre Payot who has been appointed assistant professor of pharmacognosy comes from the University of Basle and holds M.D. and Ph.D. degrees.

Dean J. E. Orr assumed his official duties as administrative head of the College August 1. His predecessor, Dean F. H. Goodrich, continues as dean emeritus and professor of pharmacology.

Dr. Walter McCarthy and family returned in early September from a year of study at the University of Cronegin in the Netherlands. Dr. McCarthy's research was in the field of organic synthesis.

Mrs. Joy Plein completed the requirements for the Ph.D. degree during summer school.

Pharmacy staff teaching summer school were Drs. Nathan Hall, Elmer Plein, and L. Wait Rising.

Dr. Elmer Plein addressed the Oregon Branch of the American Pharmaceutical Association on September 22, on "The Responsibilities of Pharmacy Practice." (L. Wait Rising)

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## BOOK REVIEWS

**Therapeutic Use of Artificial Radioisotopes**, Paul F. Hahn, Editor. John Wiley and Sons, Inc., New York, New York, 1956. x + 414 pp., 140 figs., 35 tpls. \$10.00.

This book includes nineteen chapters written by twenty-nine collaborators. The book is well illustrated with very good references appended to most of the chapters.

In 1951, Dr. Hahn edited a book entitled *A Manual of Artificial Radioisotope Therapy* which is similar in format to this book, but the latter has twenty-five new contributors and is entirely new in content and illustrations.

The reader is introduced to the fundamental properties of radioactivity which makes some isotopes useful as therapeutic agents. The book also covers the radioisotopes most commonly employed therapeutically, the clinical situations in which these isotopes are used, clinical results, and techniques of administration. In addition, other chapters are devoted to availability and procedures for procurement of isotopes, synergistic effect of radioisotopes used in combination, and problems encountered when radioisotopes are employed therapeutically.

Dr. Hahn states, "The present volume represents an attempt to show a cross section of the efforts presently being carried out in the exploitation of artificial radioisotopes in therapy." In the reviewer's opinion, this has been done adequately, and the book is a useful addition to the pharmacist's library.

This book should prove particularly useful for those using radioisotopes and clinicians embarking upon

initial therapeutic radioisotopes programs.

B. G. Dunavant  
Purdue University

**Bentley and Driver's Text-book of Pharmaceutical Chemistry**, Revised by John Edmund Driver. Sixth edition. Oxford University Press, London, 1955. viii + 751 pp., 53 figs. \$12.75.

Since the fifth edition of this book was published in 1951, the British Pharmacopœia of 1953 made its appearance; accordingly, the sixth edition incorporates the new material necessary to keep it abreast of recent developments. The author states that he has attempted to preserve the original character of the textbook, which has had wide use by persons studying for examinations in pharmaceutical chemistry throughout the British Commonwealth.

The book is divided as follows: Part I, Analytical Methods, pp. 9-98; Part II, Inorganic, pp. 101-241; Part III, Organic, pp. 245-712; and Appendixes, pp. 715-734.

The subject matter included in Part I is of a type ordinarily included in courses in quantitative analysis and drug assay in the United States, but it is so briefly considered that it could not serve as the sole means of didactic instruction in this field.

The order of presentation of subject matter in Part II on inorganic pharmaceutical chemistry is according to the periodic table, and is limited to those elements and compounds of therapeutic interest, particularly those official in the British Pharmacopœia. Therapeutic uses are indicated only briefly, if at all, and in many in-

stances are lacking. No dosages are listed, and there is no discussion of the pharmacology of the compounds.

The approach to organic pharmaceutical chemistry in Part III is strictly on the chemical basis. One chapter is devoted to methods of purification of organic compounds, and another to the determination of formulas. Following these, in successive chapters the author discusses the various classes of compounds beginning with the hydrocarbons and following with the monohydric alcohols, ethers, aldehydes and ketones, etc. Official examples are, of course, discussed under the appropriate heading.

A typical presentation for a given drug consists of the official title, purity rubric, description, method of preparation, and assay. The therapeutic use is frequently omitted. No doses are indicated, and no pharmacology is presented.

Among the material included in the appendixes are brief discussions of organic reagents for metals and identification of organic compounds, a list of British Pharmacopœia assays arranged according to type or procedure, and a list of indicators together with the assay in which each is specified for use.

An odd feature of the book is the lack of consistency in the use of the arrow in equations to indicate the direction in which the reaction proceeds; in many instances the symbol of equality ( $=$ ) is used instead.

In the opinion of the reviewer teachers of pharmaceutical chemistry in the United States will not find this book adequate. No attempt was made by the author to cover monographs of the USP and the NF, as such coverage would not be germane to his stated aim. The book is well bound, and the paper and typography are excellent. It may be of some service in this country as a reference source for anyone having an interest

in monographs contained in the British Pharmacopœia 1953.

Austin A. Dodge  
University of Mississippi

**Drug Store Operating Costs and Profits.** O. E. Burley, A. B. Fisher, Jr., and R. G. Cox. First Edition. McGraw-Hill Book Company, Inc., New York, New York, 1956, xvi + 549 pp., numerous tbls. \$8.50.

The 565 pages of the book contain the following: a preface which identifies the personnel of the policy committee, and the seven geographic area supervisors; a chapter dealing with the objectives of the study and some of the general conclusions reached; two chapters on methodology and cost distribution formulas used in the study, which methods and formulas are clarified by the instructions issued to agents and the reproductions of tabulating forms found in Appendix I; twelve chapters, each a case study of one of the twelve drugstores studied, containing a floor plan, some description of personnel, a profit and loss statement, statistics on costs, profit, and inventory, and some general evaluation conclusions; eight chapters, each of which combines the findings for one of the eight drugstore departments—prescription, proprietary medicines, fountain, etc.—into which each of the drugstores was divided; Appendix II which presents twelve tables, one for each case study, of drugstore commodity groups; and an index.

The book, published March 6, 1956, makes its appearance almost five years after the completion of the study which it reports. Many of the material findings of the study are, however, not new, for they have been published in various so-called good will advertisements and releases of drug suppliers in the interim. This is unfortunate, for a study of the book now discloses that the validity of the more important findings of the study



is questionable, both as to methods by which they were determined and the manner in which they were labeled or reported. Although a reading of the entire book will disclose to a careful and retentive reader that there are qualifications and limitations attaching to many of the reported figures, the interim releases did not disclose the limitations, and in some instances were mislabeled. The findings which are most suspect, both in the book and in the releases, are those concerning costs and profits of the prescription department, of the proprietary medicines department and of the fountain department, and the income and expense averages (reported as "medians") for drugstore operations of that period.

Only a few of the shortcomings can be reported briefly. The more important of these are as follows.

1. The figures are too old. The study was made in the last half of 1950 and the first half of 1951.

2. The study was conducted during an abnormal period. The Korean War broke within a month after the study was begun. War conditions created unusually profitable conditions through an increase in buying power and by other changes.

3. The drugstores selected for study did not fulfill many of the major requirements of a statistical sample. There was therefore no justification for reporting many of the findings of the study in statistical terms such as "averages," "ranges," or "medians." More specifically, the twelve drugstore examples are not a sample because each drugstore was selected only if it had earned a profit in the preceding year, had good financial records, had pleasant employees, had only eight specific departments with sales for each department close to a predetermined percentage of total drugstore sales, and had all unsaleable or dead stock, especially in the prescription department, removed before the study began.

It was not a statistical sample because the selected drugstores, when measured by sale size, were not in the same or approximate proportion found in a classification of all drugstores. The twelve drugstores were not representative of all drugstores for this reason. Nor was any attempt made to approximate the national distribution by weighting. The sales reported for the twelve drugstores averaged \$110,000, a high figure which has not been reached to date although great advances in sales have occurred since 1951. An "average," "range," or "median" figure found for such a group of twelve non-representative drugstores cannot, except by the rarest happenchance, be the average, range, or median of a statistical sample of the drugstore universe.

4. The formulas used to distribute certain costs to drugstore departments are inequitable. The most objectionable cost distribution formula is that used to distribute the "proprietor's total salary" to departments, functions, and commodity groups. In the study, the proprietor, or each proprietor in a partnership, was assigned an annual salary figured at the hourly rate commonly paid to pharmacists in the locality, and a bonus equal to 2 per cent of store sales in excess of \$40,000. This salary rate was then distributed to every function and to every department to which the proprietor applied himself, whether it was compounding a prescription, serving a fountain drink, cleaning a showcase, or waiting (idle time). The portion of the annual salary to be assigned to each function or department was determined by a time study of the proprietor's movements during a fourteen-day study. The proportion established by these fourteen days was applied to the full year.

By this time method of distributing salary, the prescription department was charged with only the actual time spent in or for the prescription department. Since the number of pre-

scriptions was generally insufficient in most drugstores to keep the proprietor at compounding or related professional duties for the full time worked, his professional salary rate was applied to front-store department tasks which consumed most of his time. This meant that the fountain was being serviced at times by a \$5,000 to \$12,000 a year "clerk," while the prescription department was not charged with any salary for most of the day. Under such treatment of undercosting the prescription department and overcosting the front-store departments, it is not surprising that the prescription departments, as reported, showed such exorbitant "profits" while the front-store departments showed such frightening "losses." The distribution of employee pharmacist wages was made in the same manner.

If the study planners had consulted pharmacists, they would have learned that laws require pharmacists only for prescription and drug sales, and not for the selling of fountain, tobacco, or sundry items. Had this fact been realized, the proprietor's and pharmacists salary distribution formula would, no doubt, have been reversed. Under such a reversed and equitable formula the front-store departments, with the possible exception of the proprietary medicine department, would have been charged with non-pharmacist rates, and the remainder of the proprietor's and pharmacists' wages would have been assigned to the prescription department as a cost, regardless of whether the pharmacists were working therein or not.

The formula for distributing the proprietor's salary is the most important formula used in the study, for the proprietor's salary was the highest single expense item in eight of the twelve drugstores studied. In none of these eight drugstores was the proprietor's salary less than 54 per cent of total wage expenses and reached 81 per cent of total wage

expenses incurred by drugstore number 2.

There are other objections concerning the method by which the proprietor's salary was distributed. For example, all idle time was distributed by the same proportion that was established for "selling time," thus further exaggerating the prescription department "profits" and the fountain "losses." Also, the proprietor of drugstore number 11 was granted neither a salary nor a bonus, and the formula for figuring the proprietor's salaries for drugstore number 12 is unknown for the disclosed formula for salary distribution applied only to sales "under \$200,000."

Several other cost distribution formulas are questionable. The formulas based upon traffic count are particularly inequitable. To determine the cost of space occupied by departments the drugstores were divided into "2 or 3" areas, and the cost for each square foot of floor space in an area was determined by the number of people entering that area. As a consequence the fountain, which most frequently was located in a high-value area at the front or middle depth in the store, was charged with a very high rent, while the prescription department, which was generally in the rear of the drugstore and the largest floor space user, was charged with a trifling space cost. This treatment still further exaggerated the reported prescription department "profits" and the fountain "losses." More reasonable space costs could have been determined had the study used department sales or the number of transactions as a base for distribution.

The assumption that the fourteen-day test established the traffic flow for the year is questionable. And the declaration that each person passing through a drugstore area, as established, is a "potential customer" for each department in that area, especially since the twelve drugstore average for "children visitors" was 15 per

cent of the traffic, seems to be an unreasonable premise upon which to build space costing for drugstore departments. Drugstore customers cannot, logically, be likened to or treated as department store customers.

5. Shifting standards were employed in the study. The comparableness of certain findings is destroyed because the standard or unit of measure deviated from case study to case study. A few examples will suffice.

a) Salaries and wages of drugstore number 11 were figured differently from other drugstores.

b) The "2 or 3" areas into which the drugstores were divided changed the space-costing formula. The stores are not identified, and the areas themselves varied in size, location, and departments encompassed.

c) The terms "transactions" and "units" (commodity units) are not standardized, and the term "store visitors" cannot be standardized, yet these are related to average sales, and offered as figures for comparison between drugstores. None of these average sales "per transaction," or "unit," or "store visitor" is an average sale per customer.

d) Floor layout plans for stores numbers 6 and 12 are essentially the same, yet store number 6 is described as the "extreme of errors in store planning" while store number 12 is described as "designed strategically to encourage the flow of traffic."

6. The study draws untenable, biased, and provocative conclusions. Only two examples need be shown to illustrate this point. Quoting from page 250, with added italics and capitals for emphasis, we read, "Products within this group [proprietary medicines for which a fair trade minimum price is established] which have, through continuous and extensive advertising, acquired a relatively *high consumer demand*, to the extent that little personal effort is required to move them, can probably be *offered to druggists at a lower-than-AVER-*

*AGE gross MARGIN.*" The consequence of such a policy, if one were foolish enough to adopt it, would be self destruction. The quotation reminds one of the statistician's story of the manufacturer who, upon returning from a prolonged vacation, found his former 500 factory employees reduced to one worker, because the son obeyed, to the letter, his father's instructions to make periodic checks of output by each worker, and to discharge all those who produced "lower-than-average" output.

Again, quoting from page 265, with italics added for emphasis, we read, "On an *inventory* of goods worth \$100 at retail brought from a manufacturer, the druggist could expect to *earn a gross margin* of \$86.51 during the year ( $\$100 \times 39.5$  per cent  $\times 2.19$ ). For the same \$100 . . . [*inventory at retail*] bought through the wholesaler, the druggist could earn a gross margin of \$160.55—almost twice as much as when he bought direct from the manufacturer ( $\$100 \times 33.4$  per cent  $\times 4.81$ )." The margin and turnover figures used in the quotation were found for the twelve drugstores studied.

The comparison made in the quotation is pure mathematical folly, for margin is never created by inventory. One cannot "earn a gross margin" by merely having an inventory or making purchases. Margin is not a function of inventory. Margin results only from sales, and then only if the sales dollars exceed purchase dollars for the items sold. When the oblique wording is clarified, it becomes apparent that two different annual sales figures are being compared, or, from the reverse direction, two different purchases amounts are being compared. By the formula, Inventory at retail  $\times$  the number of turns = sales, we see that sales of \$219 ( $\$100 \times 2.19$ ) is being compared with sales of \$481 ( $\$100 \times 4.81$ ). Or by the formula, Sales  $-$  margin = cost of goods sold, the comparison made is between

purchases of \$132.49 (\$219 - \$86.51 = \$132.49) and purchases of \$320.35 (\$481 - \$160.65 = \$320.35).

The mathematical reasoning in the quotation exhibits several mistakes of elemental principles. First, the demands of customers will not double nor be reduced by half depending upon the retailer's source of the goods customers purchase. Second, it is incorrect to use an *average* turnover figure—which was determined by a study of thousands of different items—as the *specific* turnover figure for one or a few of the thousands of items. A vitamin product does not turn 5.39 times just because the proprietary medicines department had a turn of 5.39 times and the vitamin product is a proprietary medicine. Third, the quotation confused, by treating as absolute equivalents, the two different concepts of "turnover." It will be recalled that the accountant's "turnover" is a dollar ratio (\$/\$), while the merchandiser's "turnover" is a rate of vanishing of specific items from inventory in a given period of time (number of items / time). The former follows dollars and never items, the latter follows items and never dollars. The only similarity between the two turnovers, when applied to the same business, is the period of time for which each turnover is figured. The significance of this third objection is clarified if, in dots indicating omission of words are replaced by the words themselves: "spread over a *variety of products*." Fourth, the average margins cannot be used as specific margins for reasons parallel to those cited in the objection given herein for turnover (second objection).

The reviewer hastens to emphasize that the merits of direct buying and buying from wholesalers is not the subject of the remarks and should not be so interpreted. Only the mathematics of the offered "proof" that one is better than the other is criticized.

On the whole, because of the technical shortcomings of the study, some statisticians and cost accountants will be displeased, but it seems safe to predict that all pharmacists will join the ranks of the displeased. The failure of the study to give any recognition to the skill and obligations of the pharmacist when figuring costs will be one reason cited. The exaggeration of the "profits" of the prescription department will be another. These "profit" figures will plague the pharmacist in the future, for the public will soon refer to them as "proof" of retail operations. Should drug suppliers act upon the findings believing that pharmacists can pay more for drug supplies or sell prescriptions for less and still make a reasonable profit, a senseless and futile battle will ensue, for the figures and findings of this study are *not* facts.

(The author of this review, a prominent educator, wishes to remain anonymous)

**The Historical Background of Chemistry**, Henry M. Leicester. John Wiley & Sons, Inc., New York, New York, 1956. viii + 260 pp., 15 figs., tpls. \$6.00.

This book is a brief history of chemistry that traces the development of chemical concepts from ancient times to the 1920's. The treatment is essentially chronological up through the eighteenth century, and topical (e.g., electrochemistry, organic chemistry, physical chemistry) for the nineteenth and twentieth centuries. A chapter on early Chinese alchemy is included, as is one on the development of chemistry as a profession in the last century.

The early portion of the book constitutes an unusually good synthesis of ancient and classical philosophy and science. Chemistry is of course given special attention, but the whole is perhaps a little overdone in a volume that does not go on to give similar ideological and cultural treat-

ment to the remainder of the history of chemistry.

In the main, the book is a lucid exposition of the development and interaction of chemical concepts. To his sound scholarly background and wide acquaintance with the literature in the field, Dr. Leicester brings the understanding of a teacher. Not only does he cover the ground completely and succinctly, but he has a knack of stopping at the right moment to explain, clearly and pointedly, the concepts he is discussing. This is a quality that the student will appreciate. Unfortunately, however, it does not seem to be maintained through the late chapters on physical chemistry, radioactivity, and biochemistry. In these, under the pressure of space and the huge quantity of material, the author becomes more encyclopedic and less painstakingly expository.

The major criticism of the book is that it does not go far enough. The publisher's blurb on the book jacket notwithstanding, Dr. Leicester stops his story in the 1920's, and the historical development of chemistry in the last generation is not covered. Being thus cut short, the book seems to lack a conclusion: there is no philosophical summation, no discussion of the impact of chemistry in modern life, and no look into the future.

These are the criticisms, perhaps, of a historian rather than those of a chemist. The historian must also point out that Dr. Leicester, who can hardly be accused of letting his enthusiasm for his subject impair the lucidity and the calmness of his style, is on occasion guilty of overstatement. For example, he states that "It was possible for a science of chemistry to develop in western culture, though it failed to appear in any other culture," because the deterioration of alchemy in the West "did not assume overwhelming force," as it did elsewhere. This statement disregards the whole complex of religious, political, economic, and other cultural factors responsible

for the rise and decline of civilizations. Similarly, Dr. Leicester's statement that gunpowder "perhaps more than anything else, was responsible for the overthrow of the feudal system. Again a chemical product produced a major revolution in society" is a monistic interpretation that disregards the commercial and nationalistic developments of the preceding three centuries as well as much subsequent history. Finally, if it were literally true that "Within twenty years after the discovery of oxygen, chemistry became basically what it is today," Dr. Leicester would hardly have had to devote half of his book to the subsequent period.

Dr. Leicester credits pharmacy with an important role in the history of chemistry in the later Middle Ages and in the seventeenth and eighteenth centuries especially. He makes no reference, except in the case of Scheele, to the pharmaceutical background of important contributors to chemistry thereafter. In this category are Klaproth, Marggraf, Rouelle, Dumas, Moissan, Proust, Dobereiner, Pelletier, and Caventou (the last two are mentioned for their work with chlorophyll), whose importance is discussed with no mention of their background in pharmacy.

*David L. Cowen*  
*Rutgers - The State University*  
*of New Jersey*

**Polysaccharides in Biology.** G. F. Springer, Editor. Josiah Macy, Jr. Foundation Publications, New York, New York, 1956. 252 pp., 31 figs., 22 tpls. \$5.00.

This book consists of the transactions of the first conference on the subject in Princeton, N. J., April 27-29, 1955. These transactions are informal discussions among a limited number of participants, including biochemists, microbiologists, pathologists, botanists, pharmacologists, clinicians, and others. Specific phases of

the subject are presented by selected authorities and informally discussed by various members of the conference. The purpose is to stimulate research in the field and promote effective communications among related departments in the biological sciences interested in the polysaccharides.

This purpose is accomplished by the presentation of four phases of the subject as follows:

- I. Problems of communication: nomenclature.
- II. Problems of classification.
- III. Bacterial polysaccharides.
- IV. Blood group substances.

These transactions are not monographs but general discussions, by the participants and guests, of material presented by the authority on each phase of the subject. This procedure resulted in full coverage of the subject matter, since each discussion contributed in varying degree to the sum total of information. Also statements by the leader in each discussion as well as members of the symposium were supported by extensive literature references. Such references are listed at the end of each section and constitute one of the major values of the book.

Aside from excellent discussions of nomenclature and classifications of the polysaccharides, the discussions on bacterial polysaccharides and blood group substances are most valuable and thought provoking for those engaged in research in these fields. Since polysaccharides are of increasing importance in the identification of microorganisms, this section should prove useful for microbiologists generally and especially for those concerned with this phase of the subject. The extensive survey of the blood substances of polysaccharide character is a real contribution to the subject.

This book represents the present thinking of many authorities, and as such constitutes a definite contribution to the whole subject of polysaccharides and their importance in dif-

ferent fields of biology. It is not a textbook, but should be most useful to research workers in biochemistry and microbiology, to pathologists, and eventually to clinicians.

George F. Reddish  
St. Louis College of Pharmacy  
and Allied Sciences

**Chemical Applications of Spectroscopy**, W. West, Editor. First Edition. Interscience Publishers, Inc., New York 1, New York, 1956. xxiv + 787 pp., 222 figs., 104 tpls., \$15.00.

This book is Vol. IX of *Technique of Organic Chemistry*, A. Weissberger, editor. It follows the general format of the other volumes of this series and exhibits the same high standards in the selection of authors. The introductory survey (70 pp.) and the final chapter dealing with fluorescence and phosphorescence (52 pp.) are written by the editor. The second chapter (115 pp.) is a presentation of the theory and chemical applications of microwave and radiofrequency spectroscopy by Walter Gordy. A large section (334 pp.) on the applications of infrared and Raman spectrometry has been contributed by R. Norman Jones and Camille Sandorfy, following a development of the theory of this subject (59 pp.) by A. B. F. Duncan who has also contributed a theoretical treatment (48 pp.) on electronic spectra in the visible and ultraviolet. Applications of this theory (78 pp.) are presented by F. A. Matsen. The main index (21 pp.) is followed by short cumulative indexes (7 pp.) for the entire series.

Scientists and students who have found the other volumes of *Technique of Organic Chemistry* helpful will welcome this latest addition to the series. It is written for the advanced student, and scrupulously avoids duplication of descriptions of apparatus previously published in Vol. I dealing with physical methods. This economy,



together with concise presentations of theoretical material, has made it possible to cover the range from radio-frequencies to the ultraviolet without sacrificing a wealth of specific references and detailed information. This reviewer is not aware of another single volume that presents the same material.

This excellent book should not be compared with those dealing with the application of spectroscopy to analytical procedures. *Analytical Absorption Spectroscopy*, edited by M. G. Mellon (John Wiley and Sons, Inc., 1950), is an example of a book of great value to the student of analytical pharmaceutical chemistry even though it does not duplicate much of the material contained in the volume under discussion. However, the analyst who has occasion to work with infrared or Raman data or to make fundamental deductions from electronic spectra will find many helpful sections in Dr. West's book.

*Chemical Applications of Spectroscopy* should be available to pharmacy students. It is too advanced to be regarded as suitable for assigned reading in undergraduate courses, but the unified treatment of electromagnetic radiation (as a powerful tool for attacking problems related to the structure of molecules) captures the imagination. Brief mention of such topics as "... the study of the magnetic resonance of unpaired electrons produced in biological materials through x-irradiation" stimulates interest and creates a desire for fundamental understanding. Librarians who acquire this volume for their pharmacy collection should check the availability of basic textbooks in quantum chemistry: Suitable titles include *Introduction to Quantum Mechanics* by L. Pauling and E. B. Wilson, Jr. (McGraw-Hill Book Company, Inc., 1935), *Quantum Chemistry* by H. Eyring, J. Walter, and G. E. Kimball (John Wiley and Sons, Inc., 1944), and *Quantum*

*Chemistry* by K. S. Pitzer (Prentice Hall, Inc., 1953). The serious student of pharmacy or pharmaceutical chemistry will need help from sources of this type when he becomes interested in the theoretical portions of Dr. West's book. However, it is written so that he can acquire much valuable reference material from it without becoming involved in quantum mechanics.

Frank M. Goyan  
University of California

**Gestation.** Claude A. Villee, Editor. Transactions of the Second Conference. The Josiah Macy, Jr. Foundation, New York, New York, 1956. 262 pp., 119 illus. \$5.00.

The Conference Program of the Josiah Macy, Jr. Foundation is evolving a tradition which encourages discussion for the purposes of communicating ideas, ameliorating differences of opinion, and comparing notes on contradictory experimental results.

In such a creative atmosphere, participants of the second conference on the subject of gestation made contributions of exceptional value. The volume edited by Claude A. Villee includes the presentation of seven authors and the concomitant discussions of sixteen other specialists in the various fields pertinent to the topic.

In these presentations research progress and working hypotheses are freely put forward to be challenged, amended, and re-focussed. The subjects considered include self-regulatory functions and social reactions in gestation and in the pregnant and lactating rats; delayed gestation in mammals, especially delayed implantations in, understandably, the mink; morphology and comparative physiology of the placenta, specifically, fetal; and uteroplacental vascular physiology.

The papers are ably presented. Each of the contributions offers consider-



able educational opportunity. The common pedagogical devices are rather effectively used. Pointed questions and provocative comments carefully interjected vitalize occasionally faltering discourses or re-route irrelevant issues. Much of this excellent guidance is capably rendered by the participating medical director of the conference.

The entire book is designed for readers with backgrounds in comprehensive general biology. It would appeal to anyone who has handled laboratory animals—veterinary students, experimental psychologists, pharmacologists. In this respect, it is a book a graduate student in pharmacology would find useful for a reference.

The editor of this volume had a formidable task, but he has accomplished it successfully.

Harry K. Iwamoto  
Baxter Laboratories, Inc.

**Textbook of Organic Medicinal and Pharmaceutical Chemistry**, Charles O. Wilson, and Ole Gisvold, Editors. Third Edition. J. B. Lippincott Company, Philadelphia, Pennsylvania, 1956. xvi + 823 pp., 10 figs., 97 tbls. \$11.00.

This book has been written because . . . "For several years, there has been a need for a textbook which would present the necessary information on organic pharmaceuticals at the undergraduate level." While it is not the first to have filled such a need adequately, the nine coauthors, including the two editors, have prepared a most comprehensive, up-to-date book, which covers the entire field of organic medicinals. The organization is primarily chemical except in those areas where pharmacological classification is obviously more useful, e.g., antihistamines. The second chapter, "Physicochemical Properties in Relation to Biologic Action," gives the reader a sound basis to approach the intricacies of

biochemical morphology in subsequent chapters. The third chapter on metabolic changes of drugs is often included in earlier courses of biochemistry, and this information could be incorporated into individual chapters.

In comparison with similar books, the chief advantage is the utilization of a group of experts whose joint effort cannot be equaled by one or two authors. However, there is a concomitant lessening of over-all continuity. The list of references at the end of each chapter is gratifying complete and recent. The discussion of isosterism in the second chapter is too brief. The impossibility of including the very latest in pharmaceutical developments is exemplified by the omission or the too brief discussion of fluorocompounds, meprobamate (Miltown), serotonin, reserpine, and the *Veratrum viride* alkaloids. The individual chapters are sufficiently complete to be read in whatever order seems most desirable. A minor improvement would be the inclusion of figures and tables in the table of contents.

The book is an indispensable addition to any pharmacy library and can fulfill the most rigorous requisites for a text in a junior or senior undergraduate course in organic pharmaceutical chemistry, provided the students have had organic chemistry, physiology, and physics.

Pierre F. Smith  
Rutgers—The State University  
of New Jersey

**The Structural Relations of Natural Products**, Robert Robinson, Editor. Oxford University Press, London, 1955. xl + 150 pp. \$4.00.

This book, being the first series of the annual Weizmann Memorial Lectures instituted in honor of Dr. Chaim Weizmann, contains a discussion of some of the recent thought concerning the possible biosynthesis of several plant constituent groups.

The first lecture deals with the fatty acids and polyketomethylene

groups, the isopentane groups, and the carbohydrates and simple non-nitrogenous substances related to them. In discussing each of these groups examples are given to illustrate the possible mechanism of the reactions. A discussion concerning the possible formation of the aromatic nucleus leading to alkaloidal biosynthesis is given. Following this the polycyclic structures are considered from the stand point of possible biosynthesis. A brief treatment of some mold metabolic products is also included.

The second lecture considers the formation of heterocyclic nitrogen compounds such as pyrrolidine, piperidine, and quinoline leading to the biosynthesis of many of the common alkaloidal structures. The third lecture is concerned entirely with the indole group of alkaloids and the possible biosynthetic pathways by which they are formed in the plant. Included here is a discussion of the ergot, yohimbine, and strychnine groups of alkaloids.

*The Structural Relations of Natural Products* is well written and intended primarily for the specialist in the field. It is well documented, containing 308 references. It is of particular value to the advanced student in pharmacognosy, but can also be used to advantage by advanced students in pharmaceutical chemistry. Future developments in the study of plant constituents depended on the elucidation of biosynthetic paths. This book presents many of the current hypotheses regarding constituent formation in plants in a clear concise manner.

N. M. Ferguson  
University of Houston

**Shock and Circulatory Homeostasis,** Harold D. Green, Editor. Transactions of the Fourth Conference. Josiah Macy, Jr. Foundation, New York, New York, 1955. 291 pp., 69 figs., 26 tpls. \$5.00.

This volume should not be reviewed

without considering the three preceding conference reports having the same title and editor. The multiprofessional conferences sponsored by the Josiah Macy, Jr. Foundation, from which these reports appear, are limited to not more than thirty participants, about half of whom are members, the others being guests. All but one of the members have been associated with the conference group from its beginning. Some of the guests have attended more than one conference.

Physical organization of the reports is in the form of special topics, each of which is presented by a guest, interspersed and followed by group interchange between members and guests. Each participant has edited his own contributions, and the editor has assumed responsibility for some modification in the order of presentation. The presentation, then, has the form of informal discussion, with the name of each contributor clearly indicated by italic print at the beginning of the material.

Because of the continuity of membership, the comments, questions, and the replies may be directly related to topics of any of the preceding conferences of the group, as well as to the special topic of the guest. The program of this conference seems to be the result of preceding conferences. For instance, a first conference topic of "Acute and Chronic Hypotension after Hemorrhage in Man," is replaced by "The Pulmonary Circulation in Hemorrhagic Shock," and a second conference topic of "Distribution and Possible Physiologic Function of Epinephrine and Nor-epinephrine," by "Action of Epinephrine in Man."

Other topics in this conference report are: "The Circulation in the Periphery," "Mesenteric Lymphatic Dynamics in the Rat," "The Circulation in the Splanchnic Area," "The Pulmonary Circulation," and "The Aortic and Coronary Blood Flow."

Each topic has a bibliography, with

emphasis on the more recent publications. Considerable previously unpublished material is presented in the body of the reports.

Methodology is given critical examination for nearly every topic. There are detailed examinations of blood flow measurements by four techniques, of vessel pressure measurements by wedged catheter and free catheter techniques, and of techniques of measuring oxygen tension in tissues. In each case questions are raised as to "What is actually measured by this technique?"; "Does it supply the necessary information to justify the conclusions drawn?"; "What are its limitations?"

The volume should be of most interest to the advanced student and to the research worker in the fields of drug action and circulation. From the point of view of the research worker, it would be valuable for the detail it contains in specific areas, and for the criticisms of techniques and the suggestions of problems yet unsolved. For the librarian this would be only a part of the special literature of the subject, to be extended to the other reports of this conference group and related volumes of other Josiah Macy, Jr. Conferences where circulatory problems are considered, as well as to other publications such as Wiggers, *Physiology of Shock*.

Reading the volume gives one the feeling of being present at the conference itself, and one finds himself making mental contributions of his own!

Harold C. Burdick  
The University of Kansas City

**The Alkaloids — Chemistry and Physiology, Volume V: Pharmacology.** R. H. F. Manske, Editor. Academic Press, Inc., New York 10, New York, 1955. ix + 388 pp., 8 figs., 31 tabs. \$9.50.

This book is a definite contribution to the pharmaceutical and medical professions and a book that has been needed for some time. It is a concise,

yet adequate, review of the pharmacology of the alkaloids with enough chemistry and physiology to give the reader an over-all understanding of the material. This is the last of a series of five volumes that have presented the chemistry and pharmacology of the alkaloids.

This fifth volume is divided into eleven major topics, each being written by a different author, and the topics group the alkaloids according to pharmacological action. The sections and their authors are: "Narcotics and Analgesics" by Hugo Drueger; "Cardioactive Alkaloids" by E. L. McCawley; "Respiratory Stimulants" by A. K. Reynolds; "Alkaloids as Local Anesthetics" by Thomas P. Carney; "Pressor Alkaloids" by K. K. Chen; "Mydriatic Alkaloids" by H. R. Ing; "Curare-like Effects" by L. E. Craig; "The Lycopodium Alkaloids and Minor Alkaloids of Unknown Structure" by R. H. F. Manske. Naturally there is some overlapping since an alkaloid of one group may be known to have several pharmacological actions. Some may find this as a fault of the book since the material for one alkaloidal principle may be discussed in several sections of the book. There is a very adequate subject and author index provided in this volume as well as a subject index for the other four volumes of this series.

Particularly noteworthy is the extensive bibliography for each section. Each author has done extensive work not only on the historical development but also on present problems dealing with the alkaloids and their derivatives. These bibliographies should be of great value for one wishing to scan the important literature on one particular series of alkaloids. The section on "Minor Alkaloids of Unknown Structure" is complete and suggests a great many opportunities for research. This section is a bit sketchy on pharmacological data and is more complete on chemical data, but this is to be expected since most of these alka-

loids have not been investigated from a pharmacological standpoint. This section is probably the most recent compilation of research data on these particular alkaloids.

This book will be of value as a reference text and would be a great asset in any pharmaceutical, medical, or chemistry library. The other four volumes would be necessary to make the set complete. Editor Manske is to be highly commended for this compilation of material on alkaloids.

Marcus W. Jordin  
*University of Arkansas*

**Histamine**, G. E. W. Wolstenholme and Cecelia M. O'Connor, Editors. Little, Brown and Company, Boston, Massachusetts, 1956. xvi + 472 pp., 130 figs., 64 tpls. \$9.00.

This book records the papers presented at the 1955 symposium on histamine of the Physiological Society and the British Pharmacological Society at the Wellcome Foundation, and the proceedings of the symposium on histamine held at the Ciba Foundation, April 6-7, 1955. The symposia were held in honor of Sir Henry Dale.

There is little doubt that this publication represents the most complete compilation of information on histamine research to date. The research and views of forty-two internationally known investigators in the fields of histamine physiology, pharmacology, and biochemistry are presented. Unfortunately space limitations forbid even a listing of the forty-four papers presented. However some idea of the scope of the material discussed may be obtained from the following selection of papers: "Distribution of Histamine in the Body" by W. Feldberg, "Histamine and Mast Cells" by G. B. West, "Histamine and Intracellular Particles" by F. C. Macintosh, "Free and Conjugated Histamine" by J. H. Gaddum, "The Mechanism of Histamine Release" by W. D. M. Patton, "Measurement of Histamine Releasing Activity" by J. L. Mongar,

"Histamine Release by Long Chain Molecules" by B. N. Halpern, "Histamine Release by Naturally Occurring Substances" by M. Rocha e Silva, "Histamine Release and Anaphylaxis" by H. O. Schild, "The Mode of Histamine Binding in Animal Tissues" by F. C. McIntire, "The Origin and Fate of Histamine in the Body" by R. W. Schayer, "Histamine and Gastric Secretion" by C. F. Code, "Histamine and Vasodilation" by R. F. Whelan, "Histamine and Nerves" by U. S. von Euler, "The Significance of Histaminase in the Body" by G. Kahlson, "The Action of Histamine on the Sympathetic Nervous System" by U. Trendelenburg, "The Origin of Histamine in the Body" by J. H. Gaddum, "The Fate of Histamine in the Body" by H. Tabor, "Remarks on the Location of Histamine in Mammalian Tissues" by H. Blaschko, and "The Mechanism of Histamine Release" by F. C. McIntire.

Many of the questions regarding the mode of histamine binding and the mechanism of histamine release still remain unanswered. There is some disagreement among the contributors and discussants on these two subjects in general. The one concept on which there is general agreement is that the majority of histamine found within the organs is present in the mast cells. The reader will find the discussions at the Ciba Foundation most interesting and containing a multitude of unsolved problems which should be investigated in the near future.

The main weakness of this particular type of publication is the unusually large amount of repetition found both in the formal presentations and in the discussions.

This book should be a valuable addition to the pharmacy libraries in those schools conducting research or offering advanced courses in pharmacology or allergic diseases.

Joseph P. Buckley  
*University of Pittsburgh*

**1956 Medical Progress**, Morris Fishbein, Editor. The Blakiston Division, McGraw-Hill Book Company, Inc., New York, New York, 1956. x + 389 pp. \$5.50.

The editor has effectively organized and correlated the contributions of outstanding professional men and women in the fields allied to medicine in an attempt to present concisely the most important technological advancements of the past year.

This volume concerns twenty-one related fields with chapters devoted to clinical medicine, allergy, rheumatic diseases, diabetes, gynecology, gastroenterology, laboratory procedures, surgery, ophthalmology, polio vaccine, neurology, physical medicine, dermatology, nutrition, cardio-vascular disease, psychiatry, neuropsychiatry, new drugs, endocrinology, ear, nose and throat, and orthopedic surgery.

The usual pattern for the chapters includes a brief introduction or history of the topic under discussion with the more recent developments correlated to the practice of medicine. Contributions are well documented with over 1200 references.

The section devoted to endocrinology deserves special commendation. The discussion of ACTH and the cortisone analogues stresses many contraindications as well as the conventional indications for this class of compounds and contains 185 references.

The book is of primary importance to research workers and medical practitioners, but would be of great value to educators in any phase of medical science in keeping abreast with recent developments.

Seldon D. Feurt  
University of Georgia

**Porphyrin Biosynthesis and Metabolism**, G. E. W. Wolstenholme, and Elaine C. P. Millar, Editors. First Edition. Little, Brown and

Company, Boston, Massachusetts, 1955. xii + 308, 70 illus. \$6.75.

This publication of the proceedings of a Ciba Foundation sponsored conference, devoted entirely to porphyrin biochemistry with Professor C. Rimington as chairman, includes not only the papers presented with a minimum of editing, but also the discussions of these papers in a free, conversational manner. The speculations and lively discussions concerning the information presented, some of which has not been previously published, are made available in this report.

The initial discussion topic was the biosynthesis of porphyrins from glycine and related intermediates and the metabolism of the intermediates. Presentations on this topic included the succinate-glycine cycle and the role of  $\delta$ -aminolevulinic acid in porphyrin synthesis (D. Shemin), some properties of  $\delta$ -aminolevulinic acid dehydrase (K. D. Gibson), metabolism of  $\delta$ -aminolevulinic acid (J. J. Scott), hem and porphyrin formation (J. E. Falk), and the biosynthesis of hem E. I. B. Dressel). Porphyrin interrelationships and metabolism were also discussed in the latter two reports and in reports on the synthesis and metabolism of hematoporphyrin (K. I. Altman, A. K. Bruce, and K. Salomon), tissue organs in chromoprotein biosynthesis (D. L. Drabkin), and porphyrin metabolism in cytochrome synthesis (A. Vannotti). Hemoglobin studies include heterogenous metabolism of hemoglobins (G. Schapira, J.-C. Dreyfus, and J. Kruh), cellular formation of intermediates during hemoglobin synthesis (B. Thorell), and relation of free erythrocyte porphyrins to hemoglobin biosynthesis (L. Eriksen).

The biosynthesis of porphyrins in microorganisms is the subject of two reports, the formation of porphyrins in photosynthetic bacteria (J. Lascelles) and porphyrin and chlorophyll biosynthesis in *chlorella* (S. Granick). Some synthetic work on uroporphyrins

II and IV (S. F. MacDonald and K-H. Michl) was also presented.

The use of inhibitors such as allylisopropylacetamide in causing deranged porphyrin metabolism, and the use of such a technique in studying porphyrin metabolism was one of the major discussion topics and included studies of some liver hem proteins and porphyrins in experimental sedormid (allylisopropylacetylcarbamide) porphyria (R. Schmid and S. Schwartz), studies of porphyrin synthesis and interconversion with special reference to certain green porphyrins in animals with experimental hepatic porphyria (S. Schwartz and K. Ikeda), metabolism of porphobilinogen and of porphyrins in the rabbit (A. Gajdos and M. Gajdos-Török), porphyrin and porphobilinogen precursors in experimental porphyria (P. Formijne and N. J. Poullie), and studies on the mechanism of porphyrin biosynthesis with the aid of inhibitors (W. Stich and P. Decker).

Porphyria diseases with the exception of experimental porphyria were excluded from the topics for the conference, which was primarily concerned with the theme of normal biosynthesis. The conference was completed with a general discussion on the position of possible porphyria intermediates in the biosynthetic pathways.

William Shive  
The University of Texas

**The Chemical Constitution of Natural Fats**, T. P. Hilditch. Third Edition Revised. John Wiley & Sons, Inc., New York, New York, 1956. xix + 664 pp., 165 tbls. \$16.00.

This standard reference has been expanded to the point where it indeed fulfills the author's objective, namely, "the descriptive presentation of the organic chemistry of the natural fats, so far as our present knowledge takes us." The inclusion of data on fats

which have been analyzed since the second edition was published (1947) is to be expected; however, the treatise is rendered more valuable because it focuses attention on the most modern aspects of fat chemistry. Technological application of the fats has carried us far beyond regarding them merely as sources of glycerol, soap, and food. Extensive industrial use of pure and technical grades of fatty acids is predicated upon a positive understanding of their constitution, which has been so completely developed that in numerous instances the fatty acids can be produced synthetically. For similar reasons modern investigators and consumers are interested in the identity of the naturally occurring glycerides which can now be isolated intact by molecular distillation, chromatographic adsorption, and low temperature fractional crystallization. To these aspects of fat chemistry the author has given extensive consideration, thus rendering his treatise modern in a most significant manner.

Roughly, one third of the book is devoted to the component acids of fats derived from plant and animal sources; another one third is concerned with the component glycerides of these fats. One lengthy chapter discloses practically all that is known of the constitution of individual natural fatty acids. The author deliberately restricted himself to the presentation of "some" aspects of biosynthesis of fats. The chapter on experimental technique differs from convention in that it by-passes the usual determination of fat constants and provides excellent coverage of the newest methods of fat analysis. Generally, the discussion of any one of the natural fats is exhaustively developed and supported by extensive documentation at the end of each chapter. The ample indices, based on five different systems, render the location of a subject in the text a simple matter.

There is one glaring omission from



the book, and this is the deliberate choice of the author. To us in pharmacy, the unsaponifiable matter with its alcohols, sterols, and pigments is of prime importance. At least one chapter on this important subject from the capable pen of Dr. Hilditch would certainly add to the value of the work. Notwithstanding this significant omission, the treatise continues to be outstanding in its field as a reliable reference which is expected to be found in any modern library serving the biological sciences.

Paul J. Jannke  
University of Connecticut

**Medicinal Chemistry, Volume II,**  
F. F. Blicke and C. M. Suter, Editors.  
John Wiley and Sons, Inc.,  
New York, New York, 1956. vi +  
311 pp., 17 figs., 65 tpls. \$10.00.

This is the second volume in a proposed series of reviews in the field of medicinal chemistry under the general supervision of an editorial board chosen from the Division of Medicinal Chemistry of the American Chemical Society. The subject matter reviewed in this volume consists of (1) "Some Chemical Aspects of the Cardiac Glycosides," written by Arthur Stoll with a supplement by T. L. Johnson, (2)

"Synthetic Estrogens," written by John A. Hogg and Jerome Korman, (3) "Analgesics. Arylpiperidine Derivatives," by C. M. Suter, and (4) "B-Haloethylamine Adrenergic Blocking Agents; Chemistry and Structure-Activity Relationships," by Glenn E. Ulliyot and James F. Kerwin. These four subjects are presented as the four chapters that make up the book.

Each chapter contains a brief review of methods of synthesis, and the attempts at correlation of chemical structure with activity, together with other subjects pertinent to the subject matter.

Extensive tabulation of compounds according to basic structure, giving brief statements of biological activity, makes these reviews very valuable to research workers in any of these four fields. A comprehensive bibliography is included with each chapter.

This work could hardly be used as a textbook but might serve as the basis of a graduate seminar. It should be on the reference shelf of everyone interested in chemical compounds having the biological effects indicated in the chapter headings.

Lloyd E. Harris  
Ohio State University

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... the position of the school of pharmacy in the university is largely what the school of pharmacy makes it.

Hugh C. Muldoon, *Am. J. Pharm. Ed.*, 2, 472 (1937)



## NEW BOOKS

**Medical and Public Health Laboratory Methods**, James S. Simmons and Cleon J. Gentzow, Editors. Sixth Edition. Lea and Febiger, Philadelphia, Pennsylvania, 1955. 1191 pp., 124 illus., 129 tpls. \$18.50 (to be reviewed in the Winter issue).

**Clinical Toxicology**, Clinton H. Thienes and Thomas J. Haley. Third Edition. Lea and Febiger, Philadelphia, Pennsylvania, 1955. 457 pp., illus., 33 tpls. \$6.50 (to be reviewed in the Winter issue).

**Tables of Physical and Chemical Constants and Some Mathematical Functions**, G. W. C. Kaye and T. H. Laby. Eleventh Edition. Longmans, Green and Company, New York, New York, 1956. 233 pp., tpls. \$5.00 (to be reviewed in the Winter issue).

**A Textbook of General Physiology**, Philip H. Mitchell. Fifth Edition. McGraw-Hill Book Company, Inc., New York, New York, 1956. 885 pp., 196 figs., tpls. \$10.50 (to be reviewed in the Winter issue).

**Principles of Renal Physiology**, Homer W. Smith. Oxford University Press, New York, New York, 1956. 237 pp., 24 figs., tpls. \$5.00 (to be reviewed in the Winter issue).

**Neuropharmacology**, Harold A. Abramson, Editor. Transaction of the Second Conference. Josiah Macy, Jr. Foundation, New York, New York, 1956. 328 pp., 26 tpls., 85 figs. \$4.25 (to be reviewed in the Winter issue).

**Currents in Biochemical Research**, 1956, David E. Green, Editor. Interscience Publishers, New York, New York, 1956. 697 pp., illus. \$10.00 (to be reviewed in the Winter issue).

**Synthetic Ion-Exchangers**, G. H. Osborn. The Macmillan Company, New York, New York, 1956. 194 pp., illus. \$6.00 (to be reviewed in the Winter issue).

**The Structure and Function of Skin**, William Montagna. Academic Press, Inc., 1956. 356 pp., illus. \$8.80 (to be reviewed in the Winter issue).

**A Pictorial History of Medicine**, Otto L. Bettmann. Charles C. Thomas, Springfield, Illinois, 1956. 318 pp., 900 illus. \$9.50.

**Starling's Principles of Human Physiology**, Charles Lovatt Evans and H. Hartridge. Twelfth Edition. Lea and Febiger, Philadelphia, Pennsylvania, 1956. 1233 pp., 721 illus. \$12.50 (to be reviewed in the Winter issue).

**Enzymes: Units of Biological Structure and Function**, Oliver H. Gaebler, Editor. Academic Press, Inc., New York, New York, 1956. 624 pp., tpls., figs. \$12.00.

**The Flavonoids in Biology and Medicine**, Maurice E. Shils and Robert S. Goodhart. The National Vitamin Foundation, Inc., New York, New York, 1956. 101 pp., 8 tpls., 8 figs. \$2.00 (paper) (to be reviewed in the Winter issue).

**Thiopentone and other Thiobarbi-**

tures, John W. Dundee. E. & S. Livingstone, London (through Williams and Wilkins, Baltimore, Maryland), 1956. 312 pp., 51 tbls., 59 figs. \$5.00 (to be reviewed in the Winter issue).

**The Drug Addict as a Patient**, Marie Nyswander. Grune and Stratton, New York, New York, 1956. 179 pp. \$4.50.

**Nerve Impulse**, David Nachmansohn and H. Houston Merritt. Transactions of the Fifth Conference. The Josiah Macy, Jr. Foundation, New York, New York, 1956. 256 pp., 82 figs. \$4.50.

**Meditations on Medicine and Medical Education**, I. Snapper. Grune and Stratton, New York, New York, 1956. 138 pp. \$3.75 (to be reviewed in the Winter issue).

**Steric Effects in Organic Chemistry**, Melvin S. Newman, Editor. John Wiley & Sons, Inc., New York, New York, 1956. 710 pp., tbls., figs. \$12.50 (to be reviewed in the Winter issue).

**Lange's Handbook of Chemistry**, Norbert Adolph Lange and Gordon M. Forker, Editors. Ninth Edition. Handbook Publishers, Inc., Sandusky, Ohio, 1956. 1985 pp., tbls. \$8.50 (to be reviewed in the Winter issue).

**Medicinal Chemistry, Volume III**, F. F. Blicke and R. H. Cox, Editors. John Wiley and Sons, Inc., New York, New York, 1956. 346 pp., figs., tbls. \$10.50 (to be reviewed in the Winter issue).

**Statistics, a New Approach**, W. Allen Wallis and Harry V. Roberts. The Free Press, Glencoe, Illinois, 1956. 646 pp., figs., tbls. \$6.00.

**The Quantitative Analysis of Drugs**, D. C. Garratt. Second Edition. The Philosophical Lib-

rary, Inc., New York, New York, 1955. 670 pp., 45 tbls. \$7.50 (to be reviewed in the Winter issue).

**Excitability of the Heart**, Chandler McC. Brooks, Brian F. Hoffman, E. E. Suckling, and Oscar Orias. Grune and Stratton, New York, New York, 1955. 373 pp., 86 figs., 13 tbls. \$6.50.

**Pharmacognosy**, Robertson Pratt and Heber W. Youngken, Jr. Second Edition. J. B. Lippincott Company, Philadelphia, Pennsylvania, 1956. 694 pp., 70 illus. \$10.00 (to be reviewed in the Winter issue).

**Textbook of Biophysical Chemistry**, Edward Staunton West. The Macmillan Company, New York, New York, 1956. 399 pp., 48 tbls., 40 figs. \$7.00.

**Gathercoal and Wirth Pharmacognosy**, Edward P. Claus. Third Edition. Lea and Febiger, Philadelphia, Pennsylvania, 1956. 731 pp., 306 illus. \$12.50 (to be reviewed in the Winter issue).

**Chemistry and Human Health**, Burnham S. Walker, Isaac Asimov, and M. Kolaya Nicholas. The Blakiston Division, McGraw-Hill Book Company, Inc., New York, New York, 1956. 445 pp., 47 tbls., 278 formulas. \$5.75.

**Modern Medicine Annual 1956** (An annual publication containing the articles that appeared in the twenty-four issues of *Modern Medicine*). Volume I and Volume II. Modern Medicine, Minneapolis, Minnesota, 1956. 924 pp. (V. I) and 1025 pp. (V. II), illus.

#### MISCELLANEOUS PUBLICATIONS

**Folic Acid in the Megaloblastic Anemias**, Richard A. Carey and Josephine L. Hutchinson. American Cyanamid Company, New

York, New York, 1956. 8½ x 11, 31 pp., 2 figs., 2 tbls. Free (paper).

**Summary of 1953-54 Statistics of Faculty, Students, and Degrees in Institutions of Higher Education,**

Leah W. Ramsey and Mabel C. Rice. United States Department of Health, Education, and Welfare, Office of Education, Washington, D.C., 1956. 5 pp., 2 tbls. Free (paper).

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*Teachers should be concerned with the attitudes and habits and appreciations of their students as well as with their techniques. They must try to develop the ability of students to think independently and to reason logically.*

Hugh C. Muldoon, *Am. J. Pharm. Ed.*, 2, 476 (1937)

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*(A professional school) . . . fails if its students have not been so impressed that they have a respect for and confidence in its ideals, and, on leaving the school, may continue to be guided by it.*

Robert C. Wilson, Am. J. Pharm. Ed., 1, 18 (1937)

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Charles H. Rogers, Am. J. Pharm. Ed., 416 (1939)



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